

GREAT SAUSAGE RECIPES AND MEAT CURING

RYTEK KUTAS



3rd Edition

"It is one of the most definitive manuals on sausage making in the English language"

Craig Claiborne





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Bo



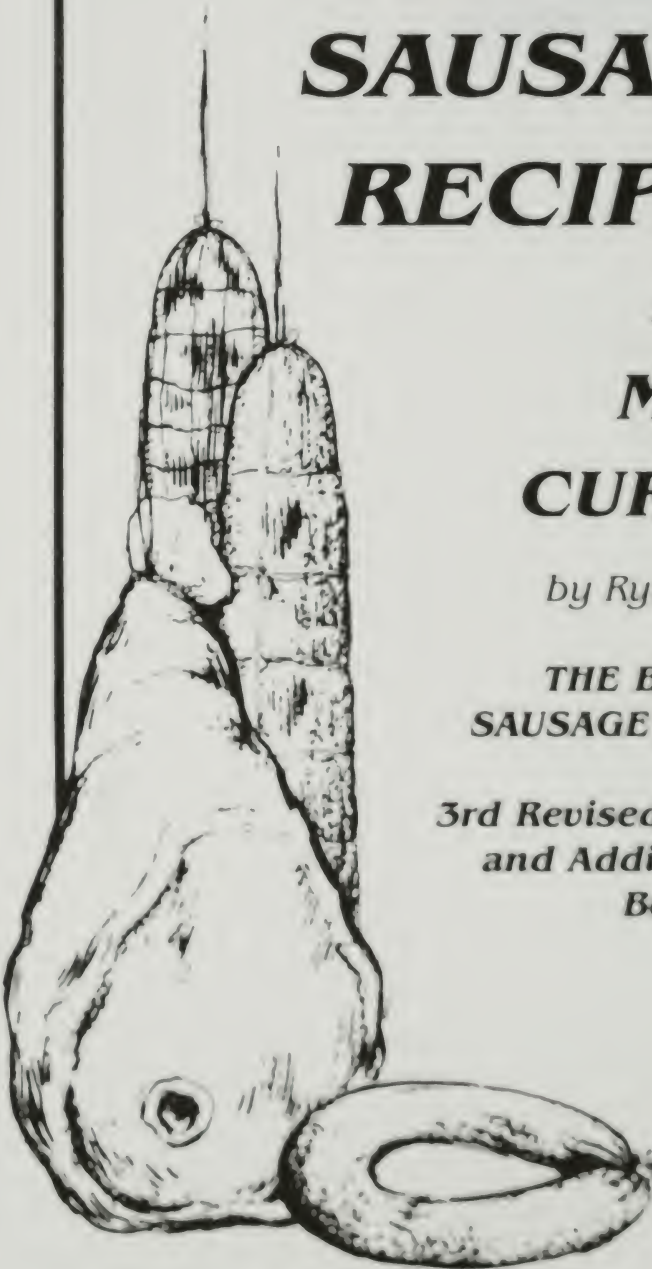
Great Sausage Recipes and Meat Curing

GREAT SAUSAGE RECIPES AND MEAT CURING

by RYTEK KUTAS

**THE BIBLE OF
SAUSAGE MAKING**

***3rd Revised Edition
and Additions by
Ben Kutas***



SPECIAL NOTICE!

• Please Read •

Originally Great Sausage Recipes and Meat Curing was published in 1976. All of the recipes in this book have always called for the use of Prague Powder #1 when curing and or smoking meats or sausage. Prague Powder # 2 has always been called for in all the dry cure sausages and meats.

Sausage Maker has decided to have its own brand name of cures:

Insta Cure #1 replaces Prague #1

Insta Cure #2 replaces Prague #2

Insta Cure

(formerly Prague Powder)

*All the recipes in this book are given in
Standard American Weights and Measures.
For those who wish to quickly convert to
metric see page 561*

“Great Sausage Recipes and Meat Curing,” Revised Edition

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The Sausage Maker, upon request, will send you a free catalog of sausage making and meat curing supplies: including casings, cures, seasonings, spices, sausage stuffers, grinders, etc., write to, The Sausage Maker Inc., 1500 Clinton St. Bldg 123 Dept. 40001-01, Buffalo, NY 14206

This revised edition of "Great Sausage Recipes and Meat Curing" book is dedicated to the memory of the author RYTEK KUTAS. With the knowledge that he passed on to me in regards to sausage making, I was able to complete the revision of this book as he wanted it. As brothers, we grew up together and stayed close throughout our entire lives. It is with this in mind that one section of this book is dedicated to recipes that were his favorites. Though they are not sausage recipes, they are excellent dishes he enjoyed.

Ben Kutas

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INTRODUCTION OR PREFACE

Over the past 20 years, I've been asked by many people how I came to write a book on sausage making and meat curing. I must have repeated the story hundreds of times of how I came to do this.

I certainly never considered myself a writer or author of books, but I had known for many years that there wasn't a single good source on this subject. By the same token, it should be pointed out that there are and always have been some excellent books available. The trouble with a lot of these books is that they are highly technical and usually deal with only one part of the subject. And they are extremely expensive and difficult to understand.

It is not uncommon to spend hundreds of dollars for each one of these books, which means you could spend up to several thousands of dollars if you wanted a complete collection of these books on curing and smoking meats as well as sausage making.

Obviously, the general public is not interested in purchasing such expensive books. Consequently, they are never seen in local bookstores or libraries. So why not a low-cost book on sausage making and meat curing? I had the training, the information, the sources for more research, and besides, nobody had ever done this before.

The big question is "why the need for another revised edition of *Great Sausage Recipes and Meat Curing*?" To begin with, the first edition of this book was printed and copyrighted in 1976. This makes the book at least 22 years old. In addition, much of the information in the first edition was being accumulated in 1963, which is over 30 years ago. On top of this, some of the information that was given at that time was already 15-20 years old. So, as you can see, some of the information is quite dated and does not apply today.

Sausage making and meat curing are no different than any other science. We all know how far medicine and other technologies have progressed in the last 50 years, and the technology of sausage making and meat curing has progressed as well. Some of the processes and products are now

obsolete and even banned from use in meat curing and sausage making. This is only one of the many reasons for another revised edition of *"Great Sausage Recipes and Meat Curing."*

When the original edition of this book was being sold, I started to receive a substantial amount of mail. From the beginning, the inquiries concerned the various cures and the ingredients needed to produce these products, and where one might purchase them.

There really wasn't any source to send these people to, so I was forced to open a small mail-order business. Needless to say, I helped everyone I could and began to establish bonds of friendship with many of these people.

The rest of the inquiries I was getting were regarding various problems people were encountering while making sausage or curing and smoking meat.

I felt good about this and enjoyed my small company and the work I was doing. At times I couldn't wait to get to work and waited for the phone to ring so I could help people. I knew if I could help them they would help me by spreading the word to their friends. We all helped each other and the enjoyment was mutual.

The mail-order business grew over the years and we mailed out thousands of catalogs containing our various products. We also offered to help anyone with problems they encounter while making sausage or curing or smoking meat. This resulted in more mail, and we were glad to help. The inquiries grew and I began an accumulation of information, documenting my answers. I realized I would have to write *"Great Sausage Recipes and Meat Curing."*

Again even more people came to us for additional recipes not found in my book. I kept track of this as well. *"Great Sausage Recipes"* had to be revised again.

Even though I received a lot of mail praising the book, the amount of correspondence and phone calls we were getting really told us that we could be better.

I learned that I had not given information in as great a detail as a person starting to make sausage or cure meat needs.

I would still like to make it very clear that I never considered myself to be an author or a writer of books. In fact, the subject that interested me the least in high school was English. About all I ever claimed was the fact that "*Great Sausage Recipes*" was written by a sausage maker with many years of experience and training. I wrote what my eyes saw, what my brain remembered, and what my hands did. Much information was obtained from sausage making and meat curing seminars held by the industry.

Yearly seminars, afforded direct contact with the producers of the products used in sausage making and meat curing. This was far better than trying to do my own research on these subjects but I made it a lifetime project to pursue knowledge in many ways and in many places. I have eaten sausage in elegant as well as humble restaurants. I've eaten a rice sausage on the streets of Taiwan, the English bangers (breakfast sausage) in an elegant London hotel, and my first all chicken sausage in a sausage factory in Warsaw, Poland. I tracked down every scrap of literature on this subject. I compared notes with other sausage makers and subscribed to any trade magazine I could find. I attended numerous trade shows and most of all, I constantly cooked and experimented.

In the process, I made a number of interesting and surprising discoveries, some of which I will pass on to you in this book. I have found that given a few fundamentals, a beginner could produce some fine tasting sausages as well as cured and smoked meats without difficulty. It is not a complex subject and actually has a beautiful simplicity and logic about it. A beginner can produce fine tasting sausages in an ordinary kitchen, with ordinary utensils and ingredients. Sometimes with exotic ingredients that can be fascinating to use but not always essential.

When I first started producing sausage at home, it seemed complex and obscure. A thoughtful and comprehensive book was needed on the art of sausage making which has been practiced with such passion and devotion for centuries.

Thus, many years later, this is the book. It is based on the premise that you know little or nothing about making sausage or curing and smoking meats. I'm assuming that you have a

lively curiosity, an interest in good eating and the desire to expand your culinary horizons. In a sense, this is not one book, but several. This is a basic handbook to answer your questions on the who, what and when of sausage making. It's a collection of many authentic ethnic recipes that are within the scope and skills of the average person. It covers just about all there is to know about the art of making sausage and curing and smoking meats. The subjects of semi-dried sausages, as well as the dry cured sausages that require no cooking or smoking are also covered.

As you begin to use this book, you will find making sausage takes no more time than ordinary cooking. Once you master the fundamental techniques, you'll be able to produce delicious and distinctive sausages with ingredients, for the most part, that can be found in any food store. You'll be able to recreate many fine sausages and meats that were made popular by the master sausage makers of centuries ago. You'll make sausages and meats that cannot even be bought in a store or restaurant.

Sausage making is an adventurous art, and a remarkable combination of surprise, mystery, and delight. There's something here for everyone, whether you are health or budget minded or just want to be imaginative and artistic. On whatever level you approach sausage making, it will bring you enjoyment, pleasure and a sense of great accomplishment. Sausage making can become an annual family affair.

Many times we have been asked, what kind of meat can I use for making a certain sausage? Remember this, your personal taste is very important when making sausage. Most store purchased sausages, used to be pork only or possibly beef. Nowadays you can find sausages made with about any kind of meat, including fish.

A recipe is one person's idea of what an item should taste like. Do not be afraid to improvise when making a sausage; flavor it to your taste. I always caution a person not to make 50 or 100 lbs. of a new recipe and then finding that you do not like the sausage. Believe me, many people have done just that. Try making 3 to 5 lbs. to see if it meets your satisfaction as far as taste is concerned.

It is you the public and the direct contact and questions with us that is really writing this revised edition of "Great Sausage Recipes and Meat Curing." Why so? Over the years we found there were more shortcomings regarding "Great Sausage Recipes and Meat Curing;" you the public told us that. These shortcomings have now been corrected for a better understanding. We also found by your questions to us that numerous things I simply took for granted were not included in this book. I have revised this book to answer these questions and include them in this second revised edition.



ACKNOWLEDGMENTS

The gratitude that I owe my parents, Mary and Stanley Kutas, cannot be measured. They played an enormous role in my becoming a sausage maker and subsequently writing this book. The sad note in my life is that these two Polish immigrants did not live to see some of the knowledge they passed on to me being used in the world's finest learning institutions.

Clarence (Wayne) Puckett was the first to suggest that I become more deeply involved in the art of sausage making and meat curing. I am truly grateful for his encouragement.

Henry Kutiej gave me that extra shove whenever I became discouraged. He was a guiding force in my involvement in sausage making and writing a book on this subject. His comfort and inspiration cannot be measured.

I am very grateful to Griffith Laboratories, for their advice on spices and technology. They were a source of never-ending assistance.

Many thanks go to John Yurkus and Lucille Lampman of the International Natural Sausage Casing Association (INSCA) for their help and encouragement, as well as the artwork they generously supplied for this book.

Mr. John Sommers, a Bavarian sausage maker, molded Henry Kutiej and me into accomplished sausage makers.

I am also obliged to Julius (Bo) Bozinski, a mail-order company executive who recommended to me that I write a book on sausage making and market it through the mail.

My feelings of indebtedness go to a great man and a good friend, Craig Claiborne. It was his newspaper article in the New York Times in April, 1980 that caused my small mail-order company to become solvent and surge forward. No other person gave me better counsel or advice.

Additionally, I have to thank Ben Kutas my younger brother, who has helped make all the weights and measures easier to understand in this new third edition.

Rytek



How it All Began

Sausage making can be traced to the time of Homer, some 900 years B.C. In his *Odyssey*, he describes Odysseus as restless. "As when a man beside a great fire has filled a stomach with fat and blood and turns it this way and that, is very eager to get it quickly roasted. Obviously he is referring to some animal casing (stomach) that is used to this day in the making of blood sausage.

Incidentally, that description bears a striking resemblance to the traditional "Black Pudding" eaten in Scotland today. It has also been reported that sausage was made and eaten by the Babylonians some 1500 years B.C., and also in ancient China. The ancient Greeks had a name for sausage, "oryae."

Fifth century B.C. literature refers to salami, a sausage which is thought to have originated in the destroyed ancient city of Salamis on the East Coast of Cyprus. Sausage had achieved such fame that Epicharmus wrote a play called *Orya The Sausage*.

The Romans called it "salus," meaning salted or preserved meat; it is from this Latin root that we get the word "sausage". The Romans were known to have made fresh sausage of pork, white pine nuts chopped very fine, cumin seed, bay leaves and black pepper. They were very fond of this fresh sausage and it was closely associated with their festivals.

As the Roman Empire crumbled and the Christian era began, Constantine, the "Great Emperor of Rome," banned these wild festivals and sausage along with them. The sausage was not banned because it was bad, but rather because it was too good. The ban riled the Romans and they resorted to bootlegging this meat delicacy. Speakeasy sausage kitchens prospered during the reigns of several Christian Emperors until strenuous popular protest eventually forced a repeal of the ban.

By the Middle Ages, sausage making had become an art practiced commercially in many localities. Many of the early sausage makers became so adept in spicing and processing distinctive types of sausage that their fame quickly spread throughout Europe

A sausage that originated in Frankfurt, Germany became known as the Frankfurter. Another produced in Bologna Italy became known as Bologna Sausage. In similar fashion, Genoa salami was named after Genoa, Berliner sausage after Berlin, Braunschwieger after Brunswick, Germany, and Goteberg summer sausage after Goteberg, Sweden.

Because refrigeration was unknown and the canning process not yet developed, the dry type sausages were made. In the colder regions, people made a semi-fresh sausage that could keep for some time. The "summer" sausage expression comes from the fact that it was made to be eaten in the summer.

Availability of other ingredients became a factor in the development of specific kinds of sausage. A plentiful supply of oatmeal was available in Scotland, so a great deal of this was used in making their sausage. Cabbage was used in the sausage of Luxemburg, and potatoes in Swedish potato sausage. Almost all primitive people made some sort of sausage. Even our own American Indians combined dried beef with dried berries and shaped it into a cake.

As immigrants traveled to America they brought their knowledge of sausage making and their preferences with them. Sausage making was as much a part of pioneer life as the log cabin. Needless to say, populations grew, cities were formed and sausage kitchens started along with them. They

duplicated the homemakers' recipes on a commercial basis.

It should be noted, however, that not all the favorite sausages originated in Europe. Philadelphia scrapple originated with the Chester County, Pennsylvania farmers as a home product. Ingenious American sausage makers created new combinations of meats and spices. Old world products were then adapted to new taste preferences.

As sausage making took on more precise and technical dimensions, fewer people bothered to make sausage as it became readily available.

To many people, making sausage is fun, but to the more dedicated, it is an art. There are also those who know nothing about it but find this process intriguing.

When we mention sausage making and meat curing we literally are talking about being able to process more than 100 items. There are various techniques to learn in curing meats or sausage, along with smoking procedures and cooking. This information also covers products like ham, cooked or broiled, pastrami, corned beef, smoked fish and many others too numerous to mention.

Fortunately for us, these great sausage recipes did not vanish as many people, for one reason or another still made their own sausage. Even now, if you had the time and could reach all these ethnic groups, there would be people who would be delighted and proud to pass on a part of their heritage. It is simply a matter of knowing where to look for this information, including the very technical sources as well.

FOREWORD

This book is an introduction to the making of sausage and the curing and smoking of meats. With more than 10 billion pounds of cured meat and meat products made annually in the United States, it is interesting to note that there is so little information in libraries and book stores concerning this subject.

This book was probably started about 40 years ago when I opened my first sausage kitchen in the western part of the United States. Since I was of Polish descent and craved kielbasa, the doors of my business opened featuring this particular sausage, either fresh or smoked. The word soon got around that a sausage kitchen had opened, and many sausage lovers showed up. I sold some Polish sausage, but most people who came by asked for various types of sausage that I never knew existed.

It was at this point that the research of this book started. I soon found out that knowing how to make one or two kinds of sausage does not make one a sausage maker. Having a small sausage kitchen in a small town, I was able to custom-make small amounts of sausage for my customers. Needless to say, there were many failures and depressing moments, but it was all good experience.

It is because of these failures that this book was written-to eliminate all the failures for you.

A careful analysis shows that curing, cooking and smoking meats can be real problems to anyone not familiar with these processes. For these reasons I have filled this book with helpful suggestions, written in simple language, detailing the importance of each step. I have included the latest information available at the time of the writing of this book.

The book has been planned in such a manner that it will be useful to the homemaker who wants to make but a few pounds of sausage for family use, as well as to the farmers and homesteaders who raise their own livestock and wish to know more about making good sausage, dry curing, curing and smoking large quantities of meats.

This book also was planned to satisfy the many instruc-

tors, librarians and teachers who have written asking for a book of this type; one that could be used as a textbook and a reference book. The above categories include anyone who wants to venture into this type of business on a commercial basis. The book contains many illustrations of the latest equipment available.

You will find that these recipes and formulas are excellent; it took many years of research to accumulate them. The various recipes came from the ethnic groups that these sausage recipes represent, since it was these people I wanted to serve. What better place to get this information than the people who actually developed these recipes?

CHAPTER I

Curing Meat

CURING MEAT

Probably the least- understood subject in the world today is the curing of processed meats and sausage. I think it would be safe to say that not one person in 50,000 really knows what is happening when a piece of meat is being cured.

References to the use of nitrate as a cure can be traced back several hundred years. When using nitrite to cure meat, it combines with the pigment of the meat to form a pink color and flavor the meat as well.

For example: A leg of a hog, better known as ham to most people. The leg of pork when cooked or roasted is, roast pork. However, when this very same pork is injected or pickled in brine, it becomes "ham" after being boiled or cooked in a smokehouse. It is the nitrite that has the ability to impart special flavors. Without it, there would be no hams or bacons only cooked or roast pork. Also, nitrites help prevent rancidity in the storage of meats and protects the meat products from botulism. The botulism poisoning we are talking about is the most deadly form of food poisoning known to man.

Very simply diagnosed, your vision is blurred in less than a day. You have trouble holding up your head, as your neck muscles are not working very well. A little while later, you have difficulty in speaking. All the neck and throat muscles do not function, and you see everything double. This is then followed by the failure of chest and diaphragm muscles, cardiac arrest, and then pulmonary failure.

It's all over in about three days if not detected. This is botulism, or food poisoning: insidious, painful and deadly. Botulism can produce its deadly toxin even without a foul odor or other sign of contamination.

Therefore cures are critical in the manufacture of smoked and cooked meat to prevent food poisoning. Botulism spores are found in every type of meat or vegetable. They are harmless and cause no problems. Lack of oxygen, low acidity, proper nutrients, moisture, and temperatures in the range of 40 degrees F. to 140 degrees F., however, are where the problems begin.

As sausage and meat are consistently smoked in these

temperature ranges. The sausages are moist, and the smoke or heat eliminates the oxygen creating perfect conditions for food poisoning if you do not use cures.

For home use, however, you should not confuse the cooking of meat in your oven with smoking meat in a smoker. Most ovens will build up a 200 degree F. temperature on the "low" setting, and most people start baking well over that temperature. This high starting temperature prevents botulism spores from surviving. This information is only meant to impress you with the fact that when you smoke meat at a low temperature, the real possibility of food poisoning is present.

Often I've had people tell me that their grandparents didn't use cures when smoking meats, since some people feel cures are not necessary. Would a person so young really know what his grandparents were doing? Probably not.

Or better still, back in the good ol' days, how many people died of natural causes? An excuse a physician would give you when he couldn't diagnose why the person died, no matter how old or young the patient was, the cause was "natural." Fortunately for us the physician today can easily diagnose food poisoning problems, and this book was written to help avoid them.

In much simpler terms, how many times have you read about food poisoning around Thanksgiving and other holidays? The well intentioned cook decides to make the dressing for the turkey the night before. This gives her more time to do many other important things the next day. She stuffs the turkey the night before, and places it in the refrigerator to be cooked the next day.

Unfortunately, she doesn't know she is creating ideal conditions for food poisoning. Obviously, the stuffing that she put into the turkey is somewhere between 40 and 140 degrees F. Because the various parts of dressing have some sort of liquid in them, the moisture is also there. Lastly, she sews up the turkey to create a lack of oxygen in its cavity.

It is that simple to create food poisoning: proper temperatures of 40- 140 degrees F., moisture, and lack of oxygen. To be sure, whenever you smoke any kind of product in the low range of 40-140 degrees F., it should

be cured. If you can't cure it, don't smoke it. It doesn't matter if it's meat, fish, poultry, cheese, or vegetable; don't take the chance. It's a pretty good bet that anything you will smoke has some moisture in it. You are removing oxygen when smoking the product and the temperatures are ideal.

Do not forget this one cardinal rule: **IF IT CAN'T BE CURED, DON'T SMOKE IT.**

Most nitrite used in curing meat disappears from the product after it has accomplished its curing effects. Within two weeks after curing, the amount of nitrite remaining in a product may be as little as one-fourth the amount initially added to it. Cured meat products typically contain 10-40 parts per million (PPM) at the time of purchase.

Your mouth and your intestines manufacture nitrite, and there is some evidence that our intestines' nitrite prevents us from poisoning ourselves with the very food we eat every day, since there is moisture in the stomach, lack of oxygen, and correct temperatures for food poisoning.

Furthermore, there has been some evidence of crib deaths when the infant was not able to manufacture enough nitrite in its system and, consequently, died of food poisoning.

Even more interesting, just to name a few nitrite-containing vegetables, plain old ordinary beets have been found to contain 2,760 PPM of nitrite; celery, 1,600 to 2,600 PPM; lettuce, 100 to 1,400 PPM; radishes, 2,400 to 3,000 PPM; potatoes, 120 PPM; and zucchini squash, 600 PPM. The source for these nitrites in the vegetables comes from nitrogen fertilizers. It is nitrogen that helps to produce the green color in vegetables and to make them grow faster.

It makes little difference whether you fertilize your vegetable garden out of a bag of chemicals or cow manure. The chemical end result will be the same - nitrogen equals nitrite.

In recent years, a number of books have been written on the subjects of meat curing and sausage making by people with no background or actual experience in this field. It is frightening to read that these people have recommended the use of ascorbic acid purchased at your local drugstore to cure sausage or meat. There is no documented scientific proof that botulism can be prevented by using ascorbic acid to cure

food poisoning if **you are using ascorbic acid to cure meat.**

The use of these nitrites for curing meats has recently come under attack by various groups of people and some government agencies. Unfortunately, there is no other substitute in the world today that can do the job. The next best thing to do is to find out if we can actually do without these chemicals, or simply lower the levels of their use.

At this time, I cannot think of anything more timely to put down on paper than the most recent rule changes proposed by the "Animal and Plant Health Inspection Service." The following paragraphs will give you a better insight on curing meats. These rules are already in effect and have been followed by the large meat processors for the past 20 years.

The following was taken from the "Animal and Plant Health Inspection Service (9 CFR parts 318, 381) Nitrates, Nitrites and Salt," U.S. Dept. of Agriculture, Animal and Plant Inspections Service, Washington, D.C.

"STATEMENT OF CONSIDERATIONS" are used in the opening paragraph of this document and in this statement of considerations, unless otherwise noted, the term "nitrate" shall mean sodium nitrate, the term "nitrite" shall mean sodium nitrite, and the term "salt" shall mean sodium chloride (common table salt).

The curing of meat and poultry products is based partly on the art as practiced over thousands of years and partly on sound scientific principles developed during the last 80 years.

Meat was first preserved with salt as the curing agent in the Saline Deserts of "Hither, Asia" and the coastal areas. These desert salts contained nitrates as impurities. Even in Homer's time (900 B.C.) curing meat with salt, followed by smoking, was an established practice. Cato (234-149 B.C.) wrote careful instructions for dry curing hams. It included rubbing with salt, overhauling with salt, rubbing with oil, smoking, and rubbing the ham again with a mixture of oil and vinegar.

However, it was not until Roman times that the reddening effect now attributed to nitrate was mentioned. The Romans had learned from the Greeks the technique of curing pork and fish with salt, and they were probably the first to establish a trade market for cured meats. Meat cured with salt containing nitrate, and even nitrite impurities developed a characteristic cured flavor and color as well as the properties of a preserved product. In time, the cured flavor became highly desirable to many people.

Reference to the use of nitrate itself can be traced back several hundred years. Its use continued after the passage of the "Federal Meat Inspection Act of 1906."

Chemists and meat scientists of the early 1900's determined that the active agent responsible for the color and flavor changes was nitric oxide, which was formed from nitrate during the curing process. Nitrite in turn is formed from nitrate, but the formulation process is difficult to control.

Therefore, once the mechanism was understood, the

department in 1925 formally authorized the direct addition of nitrite, permitting no more than 200 parts per million (PPM) of residual nitrite in a finished product. This limit has been in force and unchanged since then.

In the late 1960s, questions were raised about the use of nitrites in foods and their combination with other compounds in the food or in the body to form nitrosamines. The Federal Food and Drug Administration (FDA), the Department of Health, Education and Welfare, and the Department of Agriculture organized a scientific study group to carefully review information and data concerning this matter. This group has met regularly since its organization in 1970.

In 1970, the House Inter-governmental Relations Subcommittee conducted hearings on the issue of nitrosamine formation and the possible involvement of nitrite in cured foods. The matter was widely discussed by the public and the media, and further studies were carried out by the scientific community. Numerous conferences were held during 1972 to discuss available information on the role of nitrite in curing and preserving, and to determine what new information was needed. Again, further research was scheduled cooperatively among industry, FDA, and the Department.

Early in 1972, the Department was petitioned to ban or greatly reduce the amount of nitrite used in the curing process. The Department denied the petition, indicating additional information was needed on the chemistry associated with nitrosamine formation.

Another factor associated with the problem, and one which would not be ignored, was the recognized role of nitrites in inhibiting the growth of *Clostridium Botulinum*. These bacteria under favorable conditions can produce the deadly toxin responsible for the food poisoning known as botulism. Information in literature indicated that in the 1920's, scientists were demonstrating the antimicrobial effect of nitrite and further investigation continued through the years. In the early 1970's, concentrated research studies were begun to learn more precisely the antimicrobial role of nitrite in modern forms of meat products.

In a short time, sufficient data was gathered to satisfacto-

rily confirm the inhibitory action of nitrite to the growth of *Clostridium Botulinum* as well as the levels required to accomplish the desired effect. The studies clearly showed that the amount of nitrite needed to inhibit botulinal toxin formation was dependent upon the quantity of nitrite introduced into the product, rather than the residual level of nitrite in the finished product.

It has been necessary for the Department to act carefully and deliberately in this matter, since it recognizes that, in its desire to reduce levels to eliminate the possibility of nitrosamine formation, the very real public health hazard of botulism cannot be ignored.

Late in 1973, the Secretary of Agriculture appointed an expert panel on nitrites and nitrosamines to advise him on this difficult and controversial subject. The panel consisted of six well-qualified scientists, who represented various disciplines considered important to the evaluation of the problem. The first three meetings were devoted to presentations by scientists to help the panel build the proper foundation for its deliberations. Papers were presented on the occurrence of nitrite and nitrate in various foods, and a detailed report was given on the meat curing process and its chemistry. The panel also heard discussions on the toxicology, chemistry, and microbiology of nitrite, and on the toxicology and chemistry of nitrosamines. In addition, the role of ascorbates (salts of vitamin C) in curing was discussed.

Copies of all papers presented and the minutes of the meetings were distributed upon request and are now on file with the hearing clerk of the Department and available for inspection during regular business hours.

1. That the use of nitrate salts in the curing process be discontinued in all meat and poultry products with two exceptions, dry-cured products and fermented sausage products. These two product categories were to be addressed at a later date when additional data are available.

2. That the level of nitrite salt permitted to be added for curing meats and poultry be limited to 156 parts per million (PPM) in all processed products with the exception of bacon

and dry-cured products. Recommendations for these later products was deferred pending availability of further research data.

3. The current regulation permitted 200 PPM residual nitrite salt level be reduced in various product categories to reflect what is achievable with current technology. The panel believes that 100 PPM in cooked sausage products, 125 PPM in canned and pickle cure products, and 50 PPM in canned sterile products would be sufficient to maintain product safety. Action on bacon, fermented sausage products and dry-cured products was deferred until additional research data being developed became available.

It was the consensus of this panel that these recommendations are consistent with all safety considerations. Levels of nitrate and nitrite were decreased, thus reducing the consumer's exposure to the potential hazards of nitrosamines, nitrosamides, and related chemicals; at the same time, sufficient levels are maintained to protect the consumer against the very real hazard of botulinal poisoning.

To date, no substitute for nitrite has been discovered. No compound or treatment has been found that will produce the characteristic product that possesses nitrite's antibotulinal properties.

The panel will continue to review pertinent research findings developed in on-going studies on dry-cured products and fermented sausages, and they will determine whether to recommend further changes in permissible levels of nitrate or nitrite.

As recognized by the panel, a special problem exists with bacon. The fact that a nitrosamine is formed during its frying is apparently unique to this product. The levels found have been decreasing steadily and are in the range of 10-20 parts per billion. The meat industry has advanced this reduction through voluntary adjustments in curing procedures.

The Department, however, recognizes that greater efforts need to be directed toward the removal of nitrosamines from bacon. The problem has been discussed with the meat industry and the Food and Drug Administration. The meat processing industry already has begun studies designed to develop a

possible solution to the problem and has indicated its interest to commit additional resources to the work. New processing procedures are being explored which are directed toward preventing the formation of nitrosamines in bacon during frying. An assessment of the need of further action will be carried out both during and at termination of a 1 -year period. The Department also is considering the establishment of maximum levels of nitrite and minimum levels of ascorbate or erythorbate in the curing of bacon. Data available to the Department indicates that the proposed levels lead to reduced amounts of pre-formed nitrosamines in bacon.

As a result of the panel's recommendations, the Department proposed that other related matters warrant discussion. Thus far, most of the attention with respect to nitrates and nitrites has been directed toward red meat products.

For several years, a considerable number of products have been developed using poultry in lieu of red meat. Such products have the same basic characteristics as the red meat items, and also need protection from botulinal toxin formation. Therefore, the Department believes it necessary to make the same proposal with respect to poultry products as that set forth for meat products.

The Department is aware that some consumers have expressed a desire to purchase products cured solely with salt. Accordingly, the Department is proposing that salt (sodium chloride) be included in the list of approved curing agents. Such use would be for salt-cured products with sufficient brine concentration, or a water level such that *Clostridium Botulinum* will not grow.

Based upon current information, the Department believes the finished product should have a minimum brine concentration of 10 percent or a maximum water activity of 0.92. This brine concentration can usually be attained by using 7 pounds of salt per 100 lbs. of meat. It is determined in the finished product by analyzing for salt and moisture and dividing the salt content by the moisture content.

Water activity (usually abbreviated Aw) refers to the available water in a product which microorganisms depend on for growth, since their nutrients must be in solution. The Aw for

fresh meat is 0.99 or above, a compared to an Aw of 1.0 for pure water. This Aw for meat is near the optimum for many varieties of microorganisms, although many can grow with a lower Aw. As the Aw decreases, the conditions favoring microbial growth also decrease. An Aw of 0.92 or lower will provide ample assurance that *Clostridium Botulinum* will not grow.

An additional consideration of this proposed rule making relates to the use of curing agents in food for babies. The greater toxicity of nitrite for infants in relation to adults has been recognized for several years. For that reason, the addition of nitrite to baby foods has not been practiced for some time, although some products generally marketed as toddler foods do contain some cured products.

Therefore, to clarify this matter, the Department is proposing to deny the use of nitrates or nitrites, or meat ingredients containing nitrates or nitrites, in meat and poultry food products intended for very small children. These usually are marketed as infant (strained) and junior (chopped) foods.

Potassium nitrate and nitrite are also used on a limited basis. These agents produce the same results as their sodium counterparts. Because the potassium nitrate and potassium nitrite salts are heavier than their sodium counterparts, it is necessary to permit greater amounts of the potassium salts in order to obtain the same amount of nitrate and nitrite. This proposal makes a distinction in quantities permitted on that basis.

In establishing required levels of nitrite to be introduced into the product, the wording of the panel's recommendations implies a concern that the maximum quantities not be exceeded. What those exact levels are will vary, depending on the product and its microflora, method of preparation, packaging and handling practices. Processors need to exercise special care in keeping with good manufacturing practices to assure adequate introduction of nitrite into the product.

This means that careful control will be necessary in cases where pickle is recirculated, cleaned, and reused, so that it will not be diluted. Pickle solution held for several hours also will require special attention by the processor to determine the extent of the nitrite dissipation. Further considerations by

the panel or Department or both may be necessary in this connection.

Another consideration with respect to this proposal concerns the level of nitrite introduced into pickle-cured products. For the purpose of determining compliance with the requirements, the quantity of curing agent introduced into the product would be determined on the quantity of curing pickle injected into the product, regardless of the quantity which may drain out.

Because of the necessity to maintain strict control of the quantity of curing agents introduced into the product, it would no longer be permissible to submerge injected product in curing pickle (cover pickle), or to totally pickle cure the product by submerging it in curing pickle. However, processors could use brine solutions provided the finished product is in compliance with the other requirements.

A prohibition on curing by submerging in pickle cure could affect some small processors of cured products who live in cold regions of this country. The temperature of their facilities is influenced considerably by the outside temperatures. Because the product may freeze and not cure, it has been necessary to employ the use of pickle in the curing process to successfully cure the product. This processing procedure would have to be changed.

This proposal, for purposes of defining permissible levels of residual nitrite, makes a distinction between shelf-stable, canned-cured product and commercially sterile canned-cured product. The shelf-stable product depends upon a mixture of nitrite salt and meat pasteurization to prevent the germination of *Clostridium Botulinum* spores. Commercially sterile product receives heat treatments sufficient to destroy *Clostridium Botulinum* spores.

Based on the data and information available to the Department at this time, it is proposed to implement the expert panel's recommendations by limiting the use of sodium and potassium nitrites and nitrates as follows:

A limit would be established of 2183 parts per million (PPM) of sodium nitrate or 2497 PPM of potassium nitrate 3-5

ozs. sodium nitrate or 4.2 ozs. of potassium nitrate per 100 pounds of meat) to be added to dry-cured products; and 1716 PPM of sodium nitrate or 2042 PPM of potassium nitrate 2.75 ozs. sodium nitrate or 3.3 ozs. potassium nitrate per 100 lbs. of meat to be added to fermented sausages.

A limit would be established of 624 PPM of sodium nitrite or 768 PPM of potassium nitrite 1 oz. sodium nitrite or 1.23 ozs. potassium nitrite per 100 lbs. of meat to be added in dry-cured products and 156 PPM of sodium nitrite or 192 PPM of potassium nitrite 0.25 oz. sodium nitrite or 0.31 oz. potassium nitrite in 100 lbs. of meat to be added in fermented sausages.

Whether nitrate, nitrite, or a combination of both are used in dry-cured and fermented-sausage products, the residual nitrite calculated would be limited to 200 PPM; and in canned-cured products, whether perishable, shelf-stable, or sterile, in cooked sausages, and in other cured perishable products (other than bacon), a limit would be established of 156 PPM of sodium nitrite or 192 PPM of potassium nitrite introduced by pumping of solid pieces of meat or otherwise incorporated into comminuted products.

Canned-cured sterile products would be limited to a residual nitrite of 50 PPM calculated as sodium nitrite; all other canned-cured products would be limited to a residual nitrite of 50 PPM calculated as sodium nitrite; all other canned-cured products prepared with curing solutions to 125 PPM; and cooked sausage to 100 PPM. In addition to the above, which are in connection with the expert panel's recommendations, the following also are being proposed by the Department:

- Use of sodium or potassium nitrites and nitrates would not be permitted in meats used in commercial preparation of infant (strained) or junior (chopped) foods.

- The maximum amount of nitrite permitted to be added to bacon would be limited to 125 PPM and a requirement would be established that ascorbate or erythorbate be used at the maximum rate currently permitted by regulation.

- Salt would be permitted as a preservative when added to products in an amount sufficient so that the finished product

has a minimum brine concentration of 10 percent or a water activity (A_w) no greater than 0.92.

-The foregoing requirements with respect to nitrates, nitrites, and salt would also apply to poultry and poultry products which are prepared in a manner similar to those prescribed for red meats.

Washington, D.C. October 30, 1975

(The above rule changes are still in use and considered current as of the revision of this book.)

Today, there are cures that are available pre-packaged in small amounts with the proper amounts of nitrites in them as called for by these new rules.

You can purchase a ham cure, bacon cure, poultry cure, or sausage cure, having the proper amounts of nitrites in them on a per hundred weight basis. In fact, these cures are available today with flavors added to them that will enhance the flavor of the meat that is being cured.

Excessive use of these cures could present a health hazard and could also result in nitrite burn of the meat being cured. A green or white discoloration of the meat indicates nitrite burn. These cures should always be used with great caution when being weighed and should also be well-mixed by a responsible person.

When using 1 or 2 teaspoons of cure to make sausage, it is an excellent idea to dissolve the cure in the water you are going to mix with the meat. This method will give you better distribution of the cure.

Sodium nitrate and potassium nitrate are used in a very limited way in modern curing. In a manner of speaking, neither potassium nitrate or sodium nitrate will cure meat or give it that pink color we hear so much about. It must first undergo a change and break down to nitrite, and then sodium or potassium nitrite, which is further reduced to nitric oxide. It is the nitric oxide that really cures the meat.

In either case, there is no real need to use a nitrate compound to cure meat. The short-term schedules for curing meat today simply do not require the need for the nitrate-to-nitrite step. As mentioned earlier, the nitrate compounds are used only in dry-cure products. Potassium nitrate and potassium nitrite will provide the same results as sodium nitrate and sodium nitrite.

Although the quantity of nitrite used is very small, its effect determines whether the meat is properly or improperly cured. If too little nitrite is used, you can have cure development, but the cure color stability is poor.

Griffith Laboratories first used a product developed in Europe, where nitrite was mixed with salt and a larger quan-

tity of the salt-nitrite mix could be used in meat. Mr. C.L. Griffith soon learned that this mechanical mix could lead to serious problems. The blend was not foolproof. In such a mechanical mix a portion of the nitrite might separate from the salt, with the result that one measure might contain



The above is a photograph of 6.1 grams of sodium nitrite, the amount allowed by federal law to cure 100 pounds of meat. The 50-cent coin in the photograph gives an idea of the small amount needed.

more nitrite than another. This variation, even when small, could lead to variations in the finished product.

Mr. Griffith conceived the idea of making an absolutely foolproof cure. He wished to make a fusion of the cure with the salt, much as a metallurgist does when he makes alloys from copper, nickel and iron. Mr. Griffith realized that in order to make this fusion he could not simply mechanically blend dissimilar chemical ingredients. He decided that he would dissolve the salt, nitrite, and nitrate in water to have a completely clear uniform solution.

This saturated solution was then dried on drum rolls, and in the flash drying on the rolls, the curing ingredients became interwoven within the salt crystal, making any separation impossible. For all practical purposes, an alloy was formed. In developing Instacure, proportionate amounts of salt, nitrite and nitrate were used so that when 4 ounces of Instacure were added to 100 pounds of meat, the quantity of nitrite imparted in the meat was precisely the legal limit permitted by the Meat Inspection Division of the United States Department of Agriculture.

SALTPETER

What, exactly, is saltpeter? I know of no other product in the world that has been used so widely while being so misunderstood.

Probably worst of all, it is very difficult to find a definition for this product in your local library. The information just isn't there until you start research at college levels, or until you take a course in sausage making or meat curing.

All most people really knew was that saltpeter was used to make gun powder. And they knew if it was used to make gun powder, it just couldn't be any good for you.

Clearly and simply stated, saltpeter is a very deadly poison and its chemical name is potassium nitrate. The use of saltpeter was greatly limited by the U.S. Dept. of Agriculture in 1975. Potassium nitrate is no longer allowed for curing in smoked or cooked meat or sausages. However, it still is allowed in making dry-cured sausages such as hard salami, but in greatly reduced amounts.

Saltpeter is a term most people associate with curing meat or making sausage, but to a hunter or someone familiar with guns, it's gun powder. Sodium nitrate is in the same class as potassium nitrate, and is also banned.

Cures help develop the deep, dark mahogany color during the smoking process. During smoking, the color of the meat generally can get about twice as dark as without cures. Commercially, the cosmetics of smoked meat are quite important, since the general public associates the dark brown color with smoked meats - and rightly so.

NOTE: After cures are used in the making of sausage or curing meats, it is extremely important that the utensils and equipment be washed thoroughly. Nitrites are readily retained by utensils and equipment, and if not properly washed, nitrites can easily be passed on to other products. If you are making fresh sausage like Italian or breakfast, you will get an undesirable curing effect; the consumer can boil, cook or broil the product for hours and it will still have the appearance of raw meat. It is customary to make all fresh sausages first, followed by products that are cured.

ARTERY PUMPING

The artery pumping of pickle into ham is not new and it is the most efficient method of distributing the curing pickle uniformly and quickly through the meat. The arterial system through which the blood was carried becomes a pipeline for the pickle that cures the ham.

When the carcass is butchered, it is extremely important to find and save the artery and vein. This is usually done before the carcass is being disassembled.

Since every cell of the living animal is fed by blood circulating through the capillary system, what could be more efficient than to use nature's "pipeline" to distribute curing pickle to every cell in the ham! A minimum operation - with minimum time in cure! No part of the ham is missed, not even the bone marrow, as pickle surges through the arteries into the remotest capillaries.



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Figure 1



Figure 2



FINDING & SAVING ARTERY

Cut the artery long-before the "fork" where the branches enter the ham-for quick, easy pumping. If artery has been cut too short, pump each branch separately. If artery cannot be located, it will be necessary to Spray Pump.

It is extremely important that the artery be left long on the ham to simplify insertion of the needle for *Artery Pumping*. Loosen leaf-fat with the fingers, separating it from backbone and ribs as demonstrated in Fig. 1. Remove the leaf-fat, exposing the artery as illustrated in Fig. 2. Leave a covering of fat on the artery to keep it moist and elastic.

(CAUTION: Alongside the artery is the vein-smaller, darker, and brittle rather than elastic. Will not take pickle, but will rupture.)



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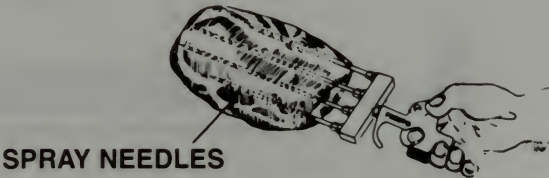
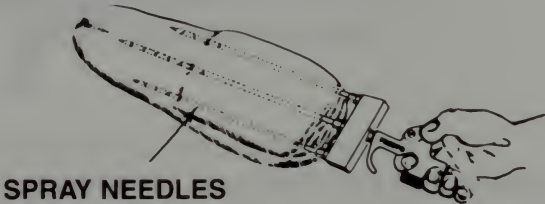
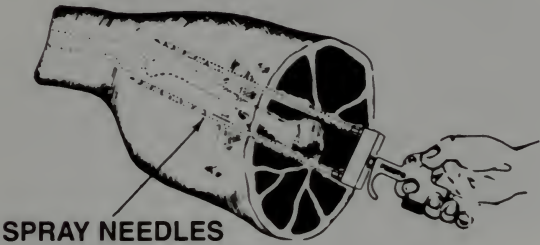
SPRAY PUMPING OR STITCH PUMPING

If the artery has been severed and there is no choice but to cure a ham by this method, use the same pickle formula as in artery pumping. With a spray needle, pump 12% of the ham's weight along the bone, around the joints and vertically in the thicker lean portions of the ham or shoulders. (12% allows for loss of about 2% due to seepage.) After spray pumping, cure in cover pickle.

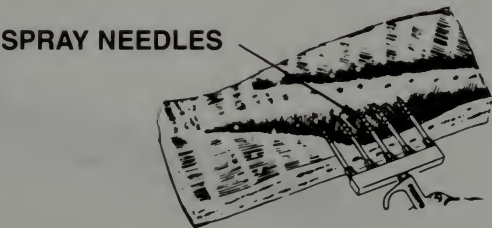
Various formulas will tell you to use so many gallons of brine solutions, and the amounts can range from 2 1/2 to 100 gallons depending on the size of your operation. In any case, the meats are pumped with this brine and then immersed in the left-over solution for further curing.

During immersion, the surface of the meat will be penetrated by the brine to give you a more even cure. The length of time for immersion is a matter of individual preference. Commercially, a ham or other kind of meat is pumped with a gang of needles and is ready for the smoker in 24 hours. For home use, this would not be the case. One needle simply cannot do what 20-30 needles can that are used commercially in a high-speed operation. You spray-pump the cure to the center of the meat and you immerse for at least 3-4 days, so the

surface will be more evenly cured. If you prefer a saltier product, you can let it cure for up to a week or 10 days.

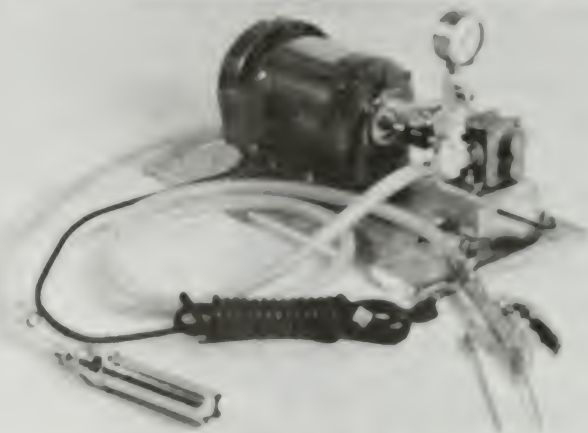


Spray pumping meat with a gang of needles.

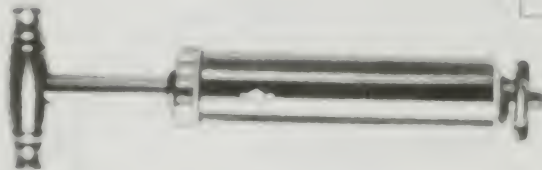
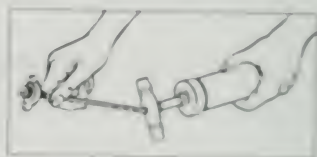


A cut away showing bacon spray pumped with a gang of needles.

MEAT PUMPS FOR ARTERY, SPRAY OR SWITCH PUMPING MEAT



Electric Meat Curing Pump



16-oz. Meat Curing Pump



4-oz. Meat Curing Pump.



A High-Production Pickle Injector

The above piece of equipment is designed with 240 hypodermic needles for uniform pickle distribution. It can cure the bacon as fast as you can put it into the machine.

BRINE SOAKING

For many years the only process for curing meats was brine soaking. The product was placed into a brine solution and held there until there was complete penetration of the meat.

This type of curing is a relatively slow process and has severe limitations in curing large pieces of meat. The meat being cured has to be held in the brine solution for an appropriate length of time. The solution's penetration time for small pieces of meat is just a matter of days while curing a large piece of meat can stretch into weeks.

When you brine-cure a ham, you use a fresh piece of meat and place it in the brine, the cure and salt will slowly penetrate the meat. If the ham is larger, it will take longer to penetrate all the way to the center. If the ham is older or you don't know its age, it may be unfit for curing. This is due to the fact that meat starts deteriorating as soon as it's butchered, and only refrigeration or freezing arrests the process.

The center of the ham remains fresh for 2-3 weeks before it is penetrated, and it is not unusual for the ham to spoil from the center. In fact, it is usually the marrow in the bone which will spoil first.

Forcing a brine solution directly into the meat has benefits over brine soaking. It should also be noted that skin and fat are definite barriers to cure penetration.

Brine soaking is still a widely accepted practice today. In most cases it is a simple case of economics and is generally used by small processors.

CURES

For the sake of a clearer understanding, the phrases "Instacure No. 1" and "Instacure No. 2" will be used in all the recipes of this book to denote the use of cures. This is being written to avoid a lot of confusion when using the word "cure" and to underscore the idea that cures are primarily used to prevent botulism (food poisoning) as well as to impart flavors and some preservation.

To some people the word "cure" is used when they are only seasoning meat at various temperatures. Other people consider removing moisture from meat as curing it. There is no such thing as curing meat or sausage without actual cures.

Incidentally, fresh sausages are never cured; only products that are smoked and cooked or the dry-cured products must be cured.

INSTACURE NO. 1

Instacure No. 1 is a basic cure that is used to cure all meats that require cooking, smoking, and canning. This would include poultry, fish, hams, bacon, luncheon meats, corned beef, pates, and many other products too numerous to mention. Instacure No. 1 is a combination of a small amount of sodium nitrite on a salt carrier. To be more specific, a pound of Instacure No. 1 contains 1 ounce of sodium nitrite to each 1 pound of salt. The formulas in this book clearly tell you which cure to use when it is needed.

This is also a good time to mention that it only takes 4 ounces of Instacure No. 1 to cure 100 pounds of sausage, 3 ounces for 50 pounds, and only 1 ounce for 25 pounds. When curing 10 pounds of meat, it takes a little less than 1/2 ounce of Instacure. Put another way, 6 level teaspoons equal about 1 ounce of Instacure, or 2 level teaspoons will cure 10 lbs. of sausage.

INSTACURE NO. 2

Instacure No. 2 is a cure specifically formulated to be used with dry-cured products. These are products that do not require cooking, smoking or refrigeration. Instacure No. 2 is also on a salt carrier and contains one ounce of sodium nitrite along with .64 ounces of sodium nitrate to each pound of salt.

Instacure No. 2 can be compared to the time-release capsules used for colds one finds in the local drugstore. The sodium nitrate keeps breaking down into sodium nitrite, then nitric oxide, to cure the meat over extended periods of time. As mentioned earlier, the amount of nitrite remaining in a cured product within 2 weeks after curing may be as little as one-fourth the amount initially added. If we are to dry cure a sausage or meat properly, it simply cannot be done with a cure containing sodium nitrite only. It dissipates too quickly, as some products require curing for up to 6 months.

Instacure No. 2 should not be used for cooked or smoked bacons. It has been found that very small amounts of sodium nitrite (Instacure No. 1) are required to cure bacon. A combination of sodium nitrite and sodium nitrate in cured bacon has been found to produce nitrosamines (cancer-producing cells) when fried at high temperatures. This problem exists only with bacon and not with ham, sausage, luncheon meats or any other cured meats.

A great deal of research has been done to find a substance to replace nitrite in processed foods, but to no avail. It will be extremely difficult to find a substance that will do all the work of nitrites-destroy botulism, help prevent rancidity, prolong preservation, give the meat color, and impart all those special flavors to hams, bacons, corned beef, pastrami, and such.

A characteristic of fresh-cured meat is its grey color. After you mix the meat, it only takes a matter of minutes for the meat to start turning grey. It then takes heat in the range of 130-140 degrees F. in order to attain the pink color which is associated with cured meats.

Curing meats is not a cure-all for preventing various problems like spoilage. Too many people are under the impression that a cured and smoked product requires little or no refriger-

ation. It is only the dry-cure meats that do not require refrigeration.

But even these products are almost always found in a refrigerated meat case when being purchased. Obviously, you minimize such things as unwanted mold and extend the life of the product dramatically.

CURING FRESH MEAT

Over a period of time, a number of people have either cured or asked about curing fresh meat products like breakfast sausage or other fresh sausage. It simply is not necessary to cure them, as these products usually are fried, broiled, baked or boiled. The rapid high temperature the product is brought to eliminates the chance of food poisoning. The balance of the fresh meat is usually frozen or used up. It is usually at the prolonged low temperature of 40-140 degrees F. that botulism can start, along with moisture and lack of oxygen. It is not necessary to cure fresh sausage or meat.

REUSING BRINES

Reusing brines is a tempting but bad practice. To begin with, the cures purchased for commercial use are so inexpensive that there is no reason to save the used brine; it is always discarded after each individual use. Also, this brine solution has been absorbed into the meats being cured. Clearly, this weakens this brine, and it no longer has the strength you need to cure other meat.

The juices of the meat itself dilute the brine, and then it becomes contaminated with bacteria. Reusing a brine could easily spoil a fresh batch of meat.

DESTROYING TRICHINAE

Because many pork products are used to make smoked, dry and semi-dry sausage, and are generally eaten without further cooking, the Meat Inspection Division (M.I.D.) of the USDA has established regulations for the destruction of trichinae that are sometimes found in pork. When the meat is being inspected, the trichinae are not being searched for and the process of destroying this parasite is left up to the individuals who process the meat.

Most of the recipes and formulas in this book will show you that the internal temperatures required will average at about 152° F. This is a fully-cooked product, ready to eat. All the larger processors of lunch meats and sausage cook their products until these temperatures are attained internally. I think the 138° F margin the M.I.D. requires is a safe one. The treatments consist of heating, refrigerating, or curing as follows:

NO. 1: HEATING & COOKING

All parts of the pork muscle tissue shall be heated to a temperature of not less than 138° F. If you are cooking the product in water, it is important that the entire product has been submerged so that the 138° F can be attained internally. It is equally important that the largest pieces of the product be included in this test, since it will always take longer to attain 138° F (58°C) internally. When using cooking cabinets or smokehouses, the products should be tested in a number of places to be sure that this temperature is attained, especially in the cooler parts of the cooker cabinet or smokehouse.

NO. 2: REFRIGERATING

At any stage of preparation and after preparatory chilling to a temperature of not above 40° F., or preparatory freezing, all parts of the muscle tissue of pork or product containing such tissue shall be subjected continuously to a temperature not higher than one of these specified in Table 1, the duration of such refrigeration at the specified temperature being dependent on the thickness of the meat or inside dimensions

of the container.

TABLE 1: Required period of freezing at temperature indicated.

<i>Temperature</i>	<i>Group 1 - Days</i>	<i>Group 2 - Days</i>
5° F	20	30
- 10° F	10	20
-20° F	6	12

Group 1 comprises product in separate pieces not exceeding 6" in thickness, or arranged on separate racks with the layers not exceeding 6" in depth, or stored in crates or boxes not exceeding 6" in depth, or stored as solidly frozen blocks not exceeding 6" in thickness.

Group 2 comprises product in pieces, layers, or within containers, the thickness of which exceeds 6" but not 27", cartons having a thickness not exceeding 27". The product undergoing such refrigeration or the containers thereof shall be spaced while in the freezer to insure a free circulation of air between the pieces of meat, layers, blocks, boxes, barrels, and tierces in order that the temperature of the meat throughout will be promptly reduced to not higher than 5° F, -10° F, or -20° F, as the case may be.

NO. 3: CURING SAUSAGE

Sausage may be stuffed in animal casings, hydrocellulose casings, or cloth bags. During any stage of treating the sausage for the destruction of live trichinae, these coverings shall not be coated with paraffin or like substance, nor shall any sausage be washed during any prescribed period of drying. In preparation of sausage, one of the following methods may be used:

METHOD NO. 1:

The meat shall be ground or chopped into pieces not exceeding 3/4" in diameter. A dry-curing mixture containing not less than 3-1/3 lbs. of salt to each hundredweight of the unstuffed sausage shall be thoroughly mixed with the ground or chopped meat.

After being stuffed, sausage having a diameter not exceeding 3 1/2", measured at the time of stuffing, shall be held in a drying room not less than 20 days at a temperature not lower than 45° F, except that in sausage of the variety known as pepperoni; if in casings and not exceeding 1 3/8" in diameter at the time of stuffing, the period of drying may be reduced to 15 days.

In no case, however, shall the sausage be released from the drying room in less than 25 days from the time the curing materials are added, except that the sausage of the variety known as pepperoni, if in casings not exceeding the size specified, may be released at the expiration of 20 days from the time the curing materials are added.

Sausage in casings exceeding 3 1/2" but not exceeding 4" in diameter at the time of stuffing shall be held in a drying room not less than 35 days at a temperature not lower than 45° F, and in no case shall the sausage be released from the drying room in less than 40 days from the time the curing materials are added to the meat.

METHOD NO. 2:

The meat shall be ground or chopped into pieces not exceeding 3/4" in diameter. A dry-curing mixture containing not less than 3 1/3 lbs. of salt to each hundredweight of the unstuffed sausage shall be thoroughly mixed with the ground or chopped meat.

After being stuffed, the sausage having a diameter not exceeding 3 1/2", measured at the time of stuffing, shall be smoked not less than 40 hours at a temperature of not lower than 80° F and finally held in a drying room not less than 10 days at a temperature not lower than 45° F. In no case, how-

ever, shall the sausage be released from the drying room in fewer than 18 days from the time the curing materials are added to the meat.

Sausage exceeding 3-1/2", but not exceeding 4" in diameter at the time of stuffing, shall be held in a drying room following the smoking as above indicated, not less than 25 days at a temperature not lower than 45° F, and in no case shall the sausage be released from the drying room in less than 33 days from the time the curing materials are added to the meat.

IRRADIATION OF MEAT FOR PRESERVATION

Radiation of meat was first used in 1943 on ground meat. The results of these studies in the early years were very inconclusive.

In 1953 The National Academy of Science Advisory Committee recommended that the U.S. Army take on the task of correlating and supporting research in the food irradiation field. The research was accelerated by advances in nuclear radiation technology.

Many countries, including the U.S.A., Canada, Japan and England were involved in research with radiating meat for the purpose of trying to prolong the shelf life.

It was thought at that time that the flavor of the meat was effected and this might turn some of the public against this procedure but even greater than this problem, the general public has a negative attitude towards radiation of any food, simply because radiation itself is looked upon as a danger to mankind. The following articles from Agriculture Research Service USDA, are current updates on the thinking and the results of many years of research on this matter.

FDA APPROVES IRRADIATION OF MEAT FOR PATHOGEN CONTROL

On Dec. 2, 1997 the Food and Drug Administration approved irradiation of meat products for controlling disease-causing micro-organisms. The approval applies to fresh and frozen red meats such as beef, lamb and pork.

"Irradiation of meat could prove to be another important tool to protect consumers from food-borne disease," said Michael A. Friedman, M.D., Lead Deputy FDA Commissioner. "The process has been shown to be safe and to significantly reduce bacterial contamination."

This approval is based on FDA's thorough scientific review of a substantial number of studies conducted worldwide on the effects of irradiation on a wide variety of meat products. The studies included examination of the chemical effects of radiation, impact on nutrient content of irradiated products, potential toxicity concerns, and effects on micro-organisms in or on irradiated products. The FDA concluded that irradiation

is safe in reducing disease-causing microbes in or on meats, and that it does not compromise the nutritional quality of treated products.

The FDA has previously approved irradiation of poultry to control pathogens, of pork for control of the trichina parasite, of foods such as fruits, vegetables, and grains to control insects, and of spices, seasonings, and dry enzymes used in food processing to control micro-organisms.

Food products are treated by subjecting them to radiation from radioactive or machine sources, which kills significant numbers of insects, pathogenic bacteria and parasites. Irradiation does not make food radioactive, nor does it noticeably change taste, texture, or appearance.

Irradiation of food products to control food-borne disease in humans has been generally endorsed by the United Nation's World Health Organization and the American Medical Association.

Disease-causing micro-organisms that can be controlled by irradiation include *Escherichia coli* 0157:H7 and *Salmonella* species.

The FDA's approval is the latest action by the Clinton Administration to take positive steps to reduce the number of consumers suffering from food-borne pathogens. Other steps include the implementation of mandatory Hazard Analysis and Critical Control Point (HACCP) safety programs at seafood, meat, poultry processing plants; expansion of the nation's network of surveillance sites for food-borne disease; funding additional research on food-borne disease control and detection; increasing the number of inspectors and inspections of domestic and imported produce; and implementing industry and consumer education programs on reducing food-borne illness risks.

Irradiation, although a potentially useful tool for helping reduce the risk of food-borne disease, is a complement to, not a replacement for, proper food-handling practices by producers.

BACKGROUND: Food Irradiation

ARS News Service
Agricultural Research Service, USDA
December 10, 1997

The Food and Drug Administration on Dec. 2 1997 approved irradiation to control microorganisms on fresh and frozen red meats including beef, lamb and pork. This FDA approval — and some previous ones — were based partly on research by chemist Donald W. Thayer of USDA's Agricultural Research Service.

The following is an overview of irradiation and some of Thayer's findings over the years. For example, he was the first to discover that irradiation could control the meat-contaminating pathogen *E. coli* 0157:H7. He has also found that irradiation kills the *Cyclospora* parasite on raspberries and strawberries.

Irradiation: An Overview

Irradiation passes through food in the form of radiant energy, without leaving any residue. Ionizing radiation — that which produces enough energy to kill bacteria and other pathogens in food — involves the use of gamma rays produced by cobalt or cesium, or X-rays or electrons from machine sources. The Food and Drug Administration has declared that low-dose irradiation of food presents no health risk.

In the 1920's, a French scientist discovered that irradiation could preserve food. During World War II, the U.S. Army tested irradiation on fruits, vegetables, dairy products and meat. Irradiated food has been routinely used for years by NASA. Donald W. Thayer, a research chemist with USDA's Agricultural Research Service, and colleagues at ARS' Food Safety Research Unit of the Eastern Regional Research Center in Wyndmoor, Pennsylvania, have been testing irradiation on food for 16 years.

Not only does irradiation extend the shelf life of fruits and vegetables, but it also kills pests. Thayer likens irradiation to pasteurization. "When used with the proper handling and processing techniques, irradiation greatly reduces the risk that

contaminated meat, poultry and other foods will reach consumers."

"Irradiation reduces the chance of food-borne pathogens reaching the consumer," says Thayer. "Scientific studies conducted worldwide over the past 40 years have shown irradiation to be a wholesome process."

According to Thayer, during the irradiation process, food never comes in contact with any radioactive material. The gamma rays, X-rays, or electrons used in the process do not make food radioactive. Irradiation, he says, is similar to exposure to sunlight or being X-rayed for medical reasons. Specific doses of radiation can kill rapidly growing cells, such as those of insects or spoilage and pathogenic bacteria. But the process has little effect on the food itself because there is no cellular activity in the food. The changes that do occur are similar to the effects of canning, cooking or freezing food.

One concern raised with irradiation is that it may affect the nutritional aspect of food. Thayer reports that irradiation can minimally affect some very sensitive vitamins like B1 in pork.

"But it has been estimated that if all the pork in the United States were to be irradiated, Americans would lose only 3.2 percent of the vitamin B1 in their diets," Thayer says. "Irradiation converts small amounts of vitamin C in fruit to another equally usable form, so nothing is lost. In fact, multi-generational studies of animals fed irradiated foods show that not only is it safe, but the nutritive value remains virtually unchanged."

Herbs, spices and seasonings can introduce bacteria that may cause spoilage or food-borne disease in food that must be stored or transported before reaching consumers. Some commercial food processors treat spices with methyl bromide to kill insects or with ethylene oxide to control bacteria and mold. Both these chemicals are extremely toxic.

Most spices, herbs and dry vegetable seasonings in the United States are treated with ionizing radiation, which was sanctioned for this particular use by FDA in 1986.

In 1963, the FDA authorized the first use of irradiation to treat food in the United States. Wheat and wheat flour were irradiated to rid them of insects. An electron beam — a result

of collaborative research between ARS and the U.S. Army — is used to kill insects on about 400,000 tons of wheat a year at the port of Odessa, Ukraine. This irradiation treatment is not used in the United States because we have other fumigants and methods of getting pests out of grain.

Most of Thayer's irradiation work has been with meat to rid it of harmful microorganisms that cause food-borne illnesses. He was the first to discover that *E. coli* 0157:H7 could be controlled by radiation and he and colleagues have successfully used irradiation against other food-borne pathogens including *Bacillus cereus*, *Clostridium botulinum*, *Listeria monocytogenes*, *Salmonella*, *Staphylococcus aureus* and *Toxoplasma gondii* on meat and poultry.

The FDA's 1990 approval to use irradiation on poultry to eliminate harmful pathogens was, in part, a result of Thayer's research, as was the Dec. 2, 1997, approval to irradiate red meat.

In addition to USDA scientists and the FDA, the list of endorsers of irradiation includes the U.S. Department of Health and Human Services, U.S. Public Health Service, U.S. Army, National Association of State Departments of Agriculture, American Medical Association, American Dietetic Association, American Meat Institute, Institute of Food Technologists, and National Food Processors Association. The World Health Organization and the Codex Alimentarius Commission sanction the use of irradiation, which is also being used in about 40 countries.

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* This background was adapted from an article in the October 1997 issue of ARS' Methyl Bromide Alternatives newsletter. The article is on the World Wide Web at <http://www.ars.usda.gov/is/np/mba/oct97/index.htm>.

VACUUM PACKING AND GAS FLUSHING

Throughout the years the meat industry has looked for ways to preserve and extend the shelf life of its fresh meat products. For the longest time chilling and freezing were by far the best and only means of preserving and increasing shelf life legitimately. As a young boy in the 1940's, I worked in a butcher market. The war was on and meat was rationed. I can remember the ground beef at the end of the day, starting to lose its bright red color. We would place the ground beef in the cooler and the next day I was instructed to mix the "dynamite" with water and mix it into the ground meat. Within minutes the ground beef was a bright red color again. As I looked back at those times I assumed that I was mixing salt peter into the meat to enhance its color.

Times have changed and definitely for the better for the consumer. Stringent government regulations on meat processing, do not allow for tampering with meat products. U.S.D.A. Meat Inspectors are present at all the packing houses to oversee that U.S.D.A. regulations are adhered to. Large supermarket chains now label meat with expiration dates and in many instances, reduce prices on meat products and have an added note on the packaging to either prepare the meat that day for purchase or place in home freezer to stop any further deterioration.

Modern technology such as vacuum packing has helped to prolong the shelf life of many meat products and along with vacuum packing a process of using modified atmosphere packaging. (MAP), a process involving a barrier package that is gas flushed with a mixture of oxygen and carbon dioxide. See article on packaging technology "reprinted with permission from the National Provisioner Magazine".

What a gas

Sophisticated materials and equipment technology have paved the way for a growing number of products utilizing modified atmosphere packaging.

By Susan Brown Technical Editor

Gone are the days when consumers traveled to the butcher shop to purchase meat for the evening meal. Today, the name of the game is convenient, fresh-tasting meat that retains its quality despite longer storage and display patterns.

One alternative is use of modified atmosphere packaging (MAP), a process involving a barrier package that is gas flushed with a mixture of oxygen and carbon dioxide. While oxygen ensures that the meat retains its red color, the carbon dioxide delays bacterial growth so the meat stays fresher longer, reports TW Kutter. Nitrogen, because it is non-reactive with meat pigments, is also used in MAP as a "filler" to maintain atmospheric pressure.

"Modified atmosphere is the use of air gases as a preservative," explains Robert Goss, national sales manager for CVP Systems Inc., a supplier of MAP machinery, and materials.

With MAP, shelf life is extended anywhere from two to five days," says Jason Dobis, product manager for Butterball Turkey Co., a division of Armour Swift-Eckrich. For 14 months, Butterball has used modified atmosphere tray packs for items such as boneless fresh turkey parts, ground turkey, Italian sausage, and fresh cutlets. "Our shelf life to the first receiver is now 14 days," says Dobis.

Typically, a level of 20% to 40% CO₂ is used in MAP, according to Aaron Brody, packaging consultant for Rubbright-Brody, Inc. Less than 20% does not satisfactorily inhibit microbial growth. Levels greater than 40% can result in package collapse because the CO₂ tends to be absorbed by the meat tissue.

Use of oxygen is key for red meat products, Brody argues. "One of the single most important consumer properties for

fresh meat merchandising is color," he says. "Red meat products turn purple if there is a lack of oxygen. Processors need to inject oxygen when they gas flush to restore full bloom at the retail level."

Suppliers of MAP packaging equipment and materials have made several advances in key areas of technology. Both the equipment and packaging have been engineered for high-speed capacity and ease of use, notes George Troyan, vice president of sales and marketing Mahaffy & Harder.

Consumer-unit gas-flushed packages that may be directly placed in the retail case are now available. "The newest generation machines produce packages that are hermetically sealed and leakproof," says Arthur Axberg, president of Ilapack. Hermetic seals also eliminate bacterial cross contamination from other packages, adds Houston Keith, product manager, barrier packaging for Amoco Foam Products Co. Many of the barrier foam trays used for MAP now look the same as the traditional overwrap tray packs to which consumers are accustomed, reports Robert Reiser & Co.

Other new equipment includes on-line leak detection for packages incorporating CO₂. As a row of packages enters the equipment's testing chamber, a vacuum is drawn and a sensor compares the remaining atmosphere with the level of ambient air. "If there is a leak, CO₂ flows out of the package and a sensor registers an increase in the CO₂ level," points out Keith Shackelford, director of marketing for Multivac, Inc. "A leak is then reported, which either triggers an alarm or stops the machine."

Processors may opt to gas-flush a master pack, in which retail units are packed within a permeable film, then placed in a barrier pouch that is vacuumized as flushed with a mixture of CO₂, oxygen, and nitrogen. Once the pouch is opened at the retail level, the exposure to the air restores the meat's color, says Chuck Jolley, market specialist for Cryovac. "In most cases, gas-flushed counter-ready fresh meat offers an eight to 14 day storage time frame, with a subsequent two- to three-day counter life," adds Goss.

Several other types of MAP systems are currently in test. Some suppliers are testing vacuum skin-packaging (VSP)

using permeable films rather than a barrier film, to enable air to contact the meat surface and bloom the product. Oxygen absorbers or scavengers are being used to absorb oxygen and increase shelf life. Also available is Cryovac's new pre-made foam tray lined with a barrier film to eliminate tray-forming. Upon loading the tray, the pack is gas-flushed and lidded with a barrier film. Headspace between the meat and the film is required because if the meat touches the barrier film, it prevents oxygen from reaching the surface, causing a lack of bloom and an undesirable color shift. A specific volume of headspace is also required to act as a "cushion" to protect the product, explains Sylvio Weber, vice president of VC999 U.S. Packaging Machines.

Anti-fog film is also key, says Don Nimis, director of marketing for Curwood, Inc. "When moist products are hermetically sealed into a container, the atmosphere within reaches 100% relative humidity," Nimis says. To prevent "fog" on the surface of films, Curwood coats the film sealant with a dispersion surfactant so that the moisture "wets" the surface instead of fogging. Nimis says the anti-fog agent is incorporated into the film layer itself to reduce the incidence of seal contamination.

MAP is no panacea, however. Some retailers have a purge problem with MAP, resulting in a sloppy package and more blood being exposed to bacterial growth, says Jim Euston, vice president of Koch Packaging Systems. Second, the process of producing modified atmosphere products is slow and expensive. "In the red meat industry, processors and retailers need longer shelf life," says Euston. "How to develop and sell [MAP] product to consumers is the big question."

One solution: CVP offers a total computerized analysis for the complete understanding of net profitability at both the retail, and the processor level. The system aids retailers and processors in understanding the true net profitability associated with MAP, says Goss.

For some processors the benefits of MAP are evident. Vitto Brand Foods, an Ontario, Canada-based processor of fresh European sausage, began using a MAP system, the result: An increase in sales and virtual elimination of product

return that previously was running between 300 to 400 lbs. per week, according to Ralph Kuhn, president. Prior to installing their MAP system, Kuhn estimates that at least 50% of the firm's packages had to be rewrapped at the retail level following deterioration during transit to and handling at the supermarket.

Other processors such as Perdue Farms Inc. are long-time MAP users. For Perdue, MAP is most prominent in its fresh poultry master packs. The company markets a tray-pack fresh Product line, and its *Perdue Done-It* line includes chicken nuggets, prepared roasts, barbeque chicken, and breaded products, says Perdue spokesperson Patricia Enright.

Another of Perdue's product lines gas flushes both the individual and the master packs, says Owen Schweers, director of packaging. The line, designed for refrigerated portion control (RPC) foodservice products, has been very successful. "The benefit to gas-flushing both packs is that there is an added safety factor to avoid leaks," Schweers says. •



CHAPTER II

Smoking Meat

SMOKING MEAT

How do we know that meat is smoked? One way is the very distinctive color of the meat that is smoked

The color that develops in smoked meat or sausage is the result of the carbon compounds combining with the meat pigments. Additionally, the cures that are used when smoking give the meat a red color. During the drying process, these cures help to bring out the color even more.

On the other hand, it is possible to get less desirable colors from the tar compounds in the smoke if the wrong type of wood is used for smoking. These tar compounds can give meat a black, sooty appearance and impart a bitter flavor to the meat.

An important reason for smoking meats is to produce flavor. To get, mellow flavors, one has to avoid the use of woods containing tar compounds. Very hard woods contain aromatic compounds which give flavor to the meats. Of the hardwoods the best for smoking is hickory. However, a good combination of hardwoods also can give good results. Even though fruitwoods are popular in the smoking of sausage and meats, one has to be careful as they contain excessive amounts of tar compounds. Fruitwoods seldom are used for smoking meats by sausage makers, yet the German Westphalian ham is smoked in juniper wood or juniper berries, which produce a distinctive flavor. The finished product resembles a large piece of anthracite coal.

So what else goes on in a smokehouse? One of the more important things that happens to smoked meat is the preserved quality it develops and the coagulation of the surface meat. Smoke emits a number of acids which will cling to the meat and form an outside layer of skin. The acid performs an important role in preserving these meats by preventing the growth of surface mold and bacteria compounds.

An example of coagulation, or forming of the outside skin, is a skinless frankfurter. The normal process is to stuff a synthetic casing that is not edible with emulsified meat; it is then linked into 5 or 6 inch (12.5 - 15 CM) lengths and placed into the smokehouse. The acids in the smoke will penetrate the

casing during this cycle. and coagulate the surface protein of the frankfurter and form the skin.

The next process is to remove the product from the smokehouse and cool it. The frankfurters are then put through a stripping machine that removes the plastic casing. Now you have a skinless frankfurter that is held together as if it were stuffed into a natural casing, but in reality it is in its own coagulated skin, developed by the acids in the smoke.

So now we know what goes on in a smokehouse. Sausage or meat is smoked to attain a distinctive color, give the meat flavor, and also to give it some preserved qualities.

The meat is being slowly cooked. Depending on the product, its size and the flavor desired, the process can take from 3-4 hours to 3-4 days. It would be fair to say a small-diameter sausage from 32-42mm can be smoked and flavored in a few hours at 160 degrees F. The penetration required is not very deep. When we smoke salami, bologna, etc., however, the penetration takes proportionately longer, and a ham can take up to several days.

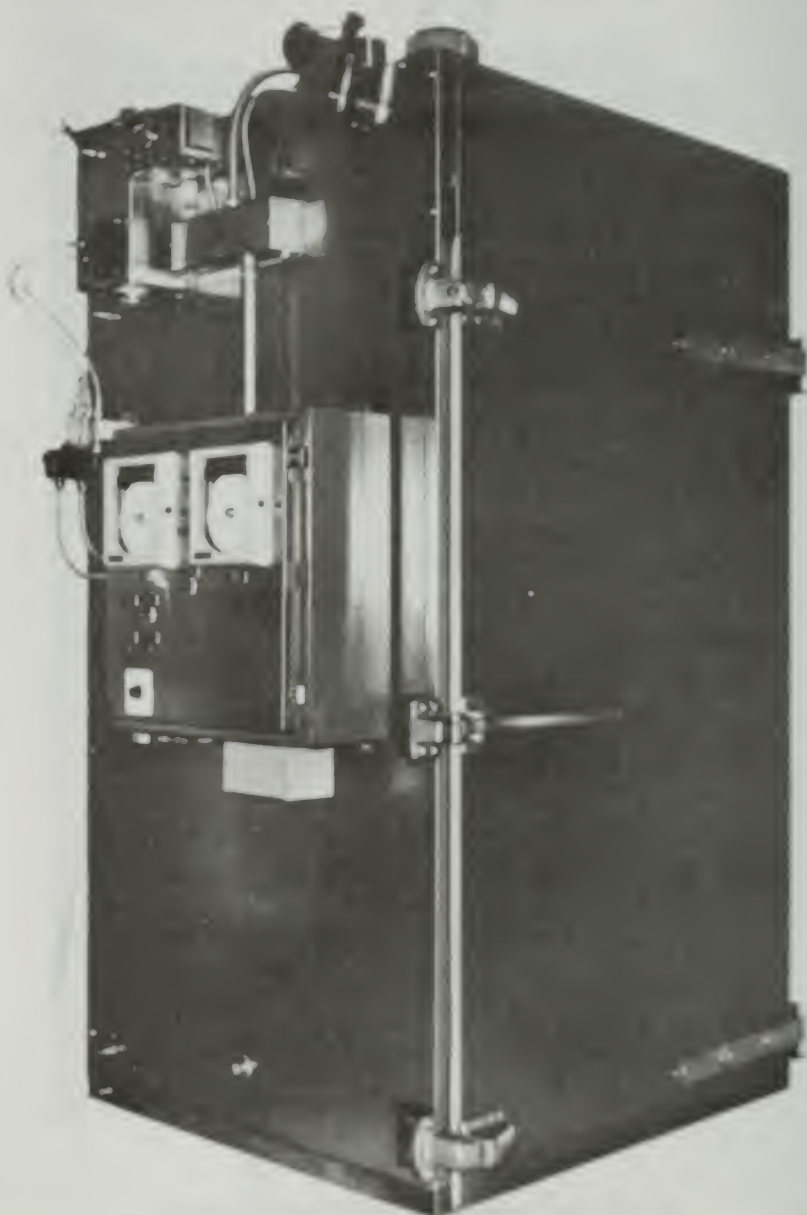


A 20-Lb. Capacity Electric Smoker For Home Use
It is designed with controls to maintain heat. Manufactured by The Sausage Maker, Inc.



A 100-Lb. Capacity Electric Smokehouse

The above smoker is totally insulated with thermal insulation capable of withstanding 400° F. temperature. This means it can be used on the outside in cool weather without fear of losing internal temperatures. Comes complete with controls. Manufactured by The Sausage Maker, Inc.



300-Lb. Capacity Gas-Fired Smokehouse

The above smoker is all stainless steel construction. It is equipped to have an oscillating air flow that prevents hot or cold spots experienced in other types of smokehouses. It is also available in 500- or 1000-lb. capacities.

SMOKE GENERATORS

Not too many years ago, a smokehouse simply consisted of a large house. The smokehouse had pits in which the fire was started and the fires were watched carefully until they consisted of hot coals. Sawdust or wood (presoaked in water overnight) was thrown on these hot coals to create a larger volume of smoke or smudge. Since the smokehouses were rather large, more than one fire was sometimes needed to distribute uniform heat and smoke.

As smoked meats and sausages became more popular, new ways had to be devised to better control the smoking and cooking of these meats, and to produce larger volumes. Controls were devised using natural gas to heat the smokers and to smudge the sawdust or wood as well. The process no longer required throwing sawdust on the hot coals, which eliminated the ashes from getting all over the meats. Smoke generators were developed and fired up on the outside of the buildings, filtering the smoke through water and carrying it into the smoker through a large diameter pipe or ductwork. Also, the shrinkage that took place in the process was reduced or sometimes eliminated.

Benefits of a smoke generator, include the ability to cold smoke. Many products are dry cured and held without refrigeration. These products can become moldy unless they are treated in some way. It is difficult to make smoke without heat.

A smoke generator will pump a significant amount of smoke into a smoker which not only will flavor the meat, but coat the meat with some of the acids that prevent bacteria growth.

The primary benefit of a smoke generator is the fact that you do not spend time tending a smokehouse.

Depending on the size of the smoke generator, it can produce smoke for 5-10 hours at a time. The container is filled and the damp sawdust is fed either automatically or by gravity. Long periods of smoking often are required for large hams, etc. It is a real pleasure to be able to go to sleep at night knowing this machine will still be doing its work when you get there in the morning.

The fan that blows the smoke in, helps to distribute the heat more evenly producing a more evenly cooked product, although heating sometimes is a problem as temperatures can vary in the top or the bottom in a smoker.

COLD SMOKING

The smokers that Sausage Maker, Incorporated manufactures are not capable of cold smoking. In order to be able to cold smoke, you have to maintain temperatures as low as 60 to 70 deg. F. or lower. There is no one I know of that manufactures a LOW COST smoker for cold smoking. Just about every low cost smoker from a few thousand dollars range up to \$20,000.00 cannot produce cold smoke. When you have a smoke generator producing smoke, it usually produces heat. In order to offset the production of heat you'd have to produce cold air; this in turn means you have to refrigerate the air. When purchasing a smoker with air conditioned or refrigerated air, the cost will be very expensive.

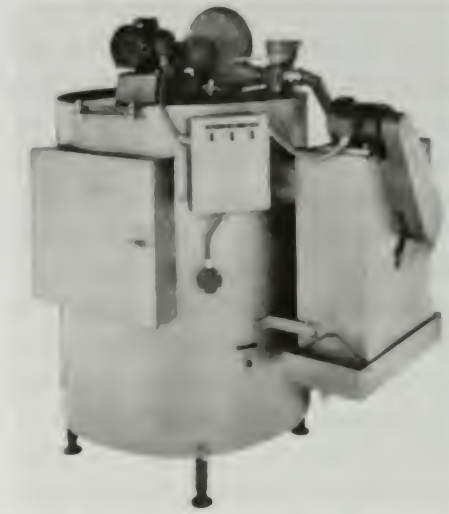
I think it is possible to produce a form of cooler smoke for home use by distancing your smoke producing generator a long way from the smokehouse. Usually a smoke generator has an exit pipe just 3" to 6" in diameter, pumping the smoke into to smokehouse just inches away. Of course the heat the smoke generator produces is also pumped into the smoker at the same time. If you move the smoke generator 10 feet or 12 feet away from the smoker and pump the smoke through a 10 inch or 12 inch pipe or tubing, the heat should dissipate by the time it reaches the smoker. A booster fan might be needed to push the smoke into the smoker. This is something to experiment with and has a potential of doing the job.

DAMP VERSUS DRY SAWDUST

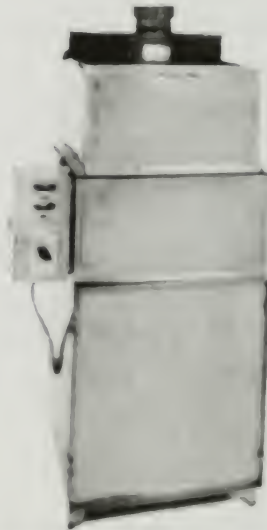
When using any kind of sawdust or wood to smoke meat, it needs to be damp. First of all, when you use damp sawdust, it won't burn up or catch fire. It imparts a very gentle flavor during the smoking process. If you smoke meat with dry sawdust, it has a more pronounced smoke flavor. It is customary to only dampen the sawdust, not soak it in water. Damp sawdust will burn for a much longer period than dry sawdust.

One suggestion for dampening sawdust for home use, is to place dry sawdust into a bucket, use a water bottle with an adjustable spray head, spray the sawdust and mix. Do this until your sawdust is just barely damp.

Automatic Feed Smoke Generators



A large Tipper smoke generator. This smoke generator can produce enough smoke to supply a 6-cage smokehouse, or will smoke over 2000 pounds of sausage at one time.



The above smoke generator is equipped with a 2 cubic foot sawdust hopper. This will give you 10-15 hours of smoke production. It is also equipped with a 12-hour auto timer shut-down control.

SMOKING PROCEDURES

First, open the dampers wide allowing the moisture to escape in the drying process. Unless the meat or sausage is dry, it is almost impossible to do a good job of smoking. Products must be dry to the touch before they start to take on any color.

In this first stage, the sausage can be dried and partially cooked to a nice brown color, and then smudge or smoke applied. There is no specific time required for the drying of this meat or sausage. Even though the formulas specify times, you have to look at the products from time to time until they have reached the desired dryness or color.

In all the formulas, with the temperature instructions, there are usually directions as to the positions of the dampers: 1/4 open, 1/2 open, or closed. These positions are used once the product is completely dry. The smoky color of the sausage actually starts in the drying stage and then the smoke is applied. You may add paprika to the sausage formula; this will help give the sausage a deeper brown color. The amount of paprika is optional: 4-8 ounces to 100 pounds of meat.

Caution should be taken not to speed up the drying process in the smokehouse. The drying process has to be done slowly and it requires some degree of patience. If you increase the temperature of the smoker, trying to speed up the drying process, two things will happen. First, the heat will cause the sausage to perspire, and condensation takes place. This keeps the outside of the sausage constantly wet and will not allow the meat to take on any color. Second, the cooking process will be starting too quickly, emitting grease through the casing before the casing can dry out. This will cause the product to look as if it isn't smoked, and will make it look greasy no matter how lean a meat was used to make it. The casing can also become tough due to excessive heat.

The meat will have a smoked flavor if it is kept in the smoker for the specified times, but nothing can be done to give it any color. The outside of the meat or sausage must be dry to the touch of your fingers; this means no grease as well, or it

will be impossible to give the product a smoked color.

Allowing the smokehouse door to remain open a crack permits the moisture to escape more readily, which in turn helps to dry the product faster. A smokehouse should not be stuffed with 400 pounds of meat if it is designed to handle 250 pounds. The formulas instruct you to space the meat properly; this means that the meats should not be touching each other. The smoke flavor will be there, but white spots will appear at the points of contact since the smoke couldn't get to these points. This will give the product a less appealing look.

Also, if the meat or sausage is packed too tightly in the smokehouse, the circulation of warm air will be poor. This in turn will not allow the moisture to escape. It will take 2-3 times as long to dry the product and just as long to smoke and cook it. The reason for proper spacing is to help dry the product and insure even smoking.



SMOKEHOUSE STICKS. Usually come in 42-48" lengths. Available in aluminum, stainless steel rod, hard woods and U shaped stainless steel.

COOKING CABINET

Smoking is a relatively quick process, and the diameter of the sausage or product is the most important factor. Obviously, a sausage having a 1-1/2" diameter can be smoked in a few hours; however, a ham which is much thicker, takes several days for the smoke to penetrate. In either case, the final process of cooking can be done in steam cookers.

Sausage smoked and cooked in a smokehouse is fine for a small operation, since it takes from 8-10 hours to complete the entire process. In a larger operation, when a steam cooker is available, you can produce three times as much product in this same period of time. While it takes 3 hours to smoke the product and an additional 5-6 hours to cook it, the steam cabinet will cook the product in a matter of minutes.

Before steam cabinets, the cooking of sausage was done in large cooking tanks to finish off the process. For home use, you can smoke a product in your smoker and finish it by cooking it on your kitchen stove. Or you can leave it in the smoker to cook.

Temperatures should be the same when you cook in water or in a smoker. The steam cooker process is different and shorter, and the manufacturer of the cabinet includes operating instructions for the various types of meats that could be cooked in that manner.



Electric Vat Cooker

The above cooker is completely portable and of stainless steel construction. This piece of equipment is ideal in a small sausage kitchen to cook by-products for making sausage, as well as cooking the sausage itself.

INTERNAL TEMPERATURES

The internal temperatures that have to be attained in sausage making are of extreme importance. Great care has to be taken, as it can mean the success or failure of the finished product. For the most part, 152° F is the internal temperature required in the sausage recipes and meat formulas. There are some exceptions when making a sausage with meat other than pork, but you are always safe with an internal temperature at 152° F no matter what meat you are processing.

It is equally important that the heat in the smoker does not exceed the specified temperatures. When in doubt, do not exceed 160° F.

Smoking any kind of meat at 160° F until the internal temperature reaches 152° F is a slow process and can take many hours. Commercially, meat is smoked to a nice dark color at the specified temperatures, then placed into a cooker or steam cabinet until the internal temperature reaches 152° F.

It is easy to tell if the product has been overcooked. When cooking any kind of luncheon meat like bologna, etc., the fibrous casing will become full of liquid. The same applies to sausage or wieners. A sure sign of overcooking sausage in a smokehouse is a shriveled sausage and grease all over the floor (or too much grease in the cooking utensil). Temperatures should be followed precisely.

However, it should be noted that fat in a product like sausage or cured meat does serve a useful purpose. In fact, it does help bind the sausages and lunchmeats or salamis. Fat or lard, when warm, is usually in liquid form. When cooled, it becomes rigid and solid. When sausage or lunchmeat is cooled properly (usually overnight), the fat along with the meat and other products become firm or solid, and cuts or slices neatly.

However when you cook the sausage or lunchmeat the fat we need as a binder turns into oil, seeps out and we lose our binding power. Fat will not turn into oil when you cook below 160° F or less, it'll remain as fat and becomes an excellent

The below baby dial thermometers have a range of 0° - 220°. They are only 6 inches long but an absolute must in sausage making and smoking meat. They are not designed for use in a kitchen oven or other high temperature compartments.



Notice the thermometer is placed in the top, rather than the bottom, of the sausage. This prevents grease from dripping on the floor of the smokehouse.



and tasty binder.

You can rest assured that when you see fat dripping from a salami or sausage in the smoker, you are overcooking the product. There is no question about this fact. When the product is finished, cooled and sliced, it will usually crumble as the binding power of the fat has been lost.

When smoking fish or poultry these products can be smoked and cooked in the 200° F range and at this high temperature, the use of cures is unnecessary.

Many people like fat in their sausage. In fact, there are a number of formulas that call for more fat than average, and in some cases you just can't get away from it. A cooked capicola is one such product, or a smoked pork butt. These meats are usually cured and smoked in one piece and it is difficult to know how much fat is in these products. The Italian sopressata and some dry-cured salamis are some examples of formulas that can call for larger amounts of fat and are even desired. There are many people who like fat and who, right or wrong, don't worry about cholesterol. I am one such person. As a child growing up in the 1930's, we used the leftover bacon fat to make our popcorn. Further still, we would render some salted pork fat with finely chopped onions. We would then let it sit overnight and simply use it in place of butter, which very few people could afford in those days. I must confess that from time to time I make popcorn with bacon fat. In addition, I will still render the pork fat as mentioned above and enjoy every moment of eating this way.

SHOWERING WITH COLD WATER

For the most part, sausages, cooked salami, wieners, bologna and the like are showered with cold water after removal from the smokehouse. The reason is that it will prevent the sausage and larger luncheon meats from shriveling up. This happens very rapidly, so the product should be put under the cold shower quickly. Remove from the smoker and place under the shower, quickly. With a small 20 lb. smoker, rather than using a hose for showering, use a clean five gallon plastic container filled with cold water. Once the sausage

is fully cooked, just drop into the cold water and run cold water into the container until the internal temperature drops to around 120°. If the sausage should become shriveled, put it into hot water, cook it to bring back its firmness and then shower with cold water.

BLOOMING

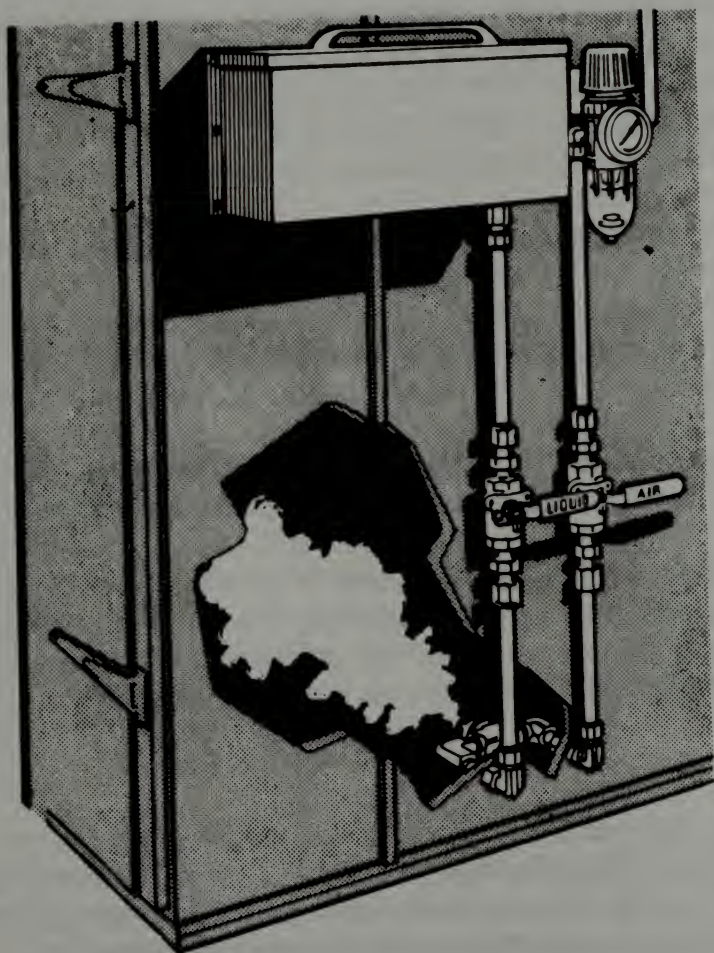
After the sausage or product is cooled with cold water, it is allowed to remain at room temperature for drying. If you prefer to have sausage with darker brown colors, simply let the sausage hang at room temperature. The longer the product is allowed to hang at room temperature, the darker its color will become. This is called "blooming" the product. Usually, two to three hours is sufficient time to attain a nice brown color. Refrigerate after the blooming process is complete.

LIQUID SMOKE

In addition to speeding up the process of cooking sausage and various meat products, another use also has been found for the cooker cabinet. Many sausages need to only be flavored with smoke. Steam cabinets can be purchased with atomizers (spray nozzles) already installed. The liquid smoke is simply sprayed on the small-diameter products, and the entire process of cooking and smoking is over in a matter of minutes.

Many processors simply add a certain amount of liquid smoke to the product when it is being mixed or pumped with pickle. Air pollution control boards prefer this process, as it does not pollute the air. For larger processors, liquid smoke does away with smoke generators, the storage of sawdust, and leads to a cleaner and less costly operation.

The liquid smoke itself, is made by burning green hickory wood; the smoke is then condensed into a liquid. This is processed and the undesirable particles are filtered out. The liquid can be used by adding it directly to the meat, spraying a product before cooking, atomizing in a smokehouse, and even introducing this liquid onto a hot plate, where it will vaporize into the smoke itself.



A Gravity-Fed Liquid Smoke Atomizer

This is a 2-h.p. model and is ideal for smoking 300-500 lbs. of sausage. Manufactured by Koch Mfg.

An important advantage to using liquid smoke is the fact that it does enhance the peelability of a skinless frankfurter when using synthetic casings. Application of the smoke solution to the surface of the frankfurter during the heating or cooking process helps to coagulate the meat protein to form a smooth skin texture. Also, when used internally or externally on the product the liquid smoke minimizes micro-organism growth. Finally, the desired level of smoke flavor can be controlled through standardization to the consumer's satisfaction.

Various products require substantial smoke flavor; others require just enough to bring out the seasonings and natural flavors of the particular products being processed. Commercially you can do as well with liquid smoke as with wood smoke in achieving the same flavor, color, and preservation qualities.

Natural liquid smoke flavors should be used according to the flavor desired, and test lots should be run accordingly. To obtain good distribution in fine or coarse chopped sausage, dilute the liquid smoke with the water you are going to use to mix with the meat. The recommended usage level for 100 lbs. of meat is four ounces of liquid smoke. For a small batch of five pounds of meat, add one teaspoon. Experiment with how much liquid smoke you may want to use according to your taste.

Liquid smoke also is used when brining products for smoking like hams, bacon and picnics. Add one ounce per gallon of brine and pump the product to 12 percent of its weight.

BUILDING A SMOKER

An old freezer works well as a smokehouse for a number of reasons. First, you have a smoker that is about 80% built. There may be a few shelves to remove but it is already insulated and prevents anyone from burning themselves when the smoker is operational. There are four steps to building your own smoker at home:

DRAFT

Including a draft at the bottom of a smokehouse is critical. It does not matter where you put it, just as long as it is included in the design.

During the process of drying sausage or meat in a smokehouse, the proper opening in your damper in relation to the draft opening will allow the unwanted moisture to escape. In the beginning of this drying cycle, the dampers and draft are always wide open to create a draft, allowing moisture to escape at a much faster rate. Even during the regular smoking cycle there is a definite amount of moisture coming to the surface of the meat. The draft and damper, even though not wide open, still allow moisture to escape during the smoking cycle.

From time to time there will be an excessive buildup of heat in a smoker that can easily be removed by adjusting the draft and damper, then readjusting them to the original position when you reach the required temperature. A commercial smokehouse would set off exhaust fans to push out excessive heat or moisture.

There is a variety of smokers on the market for home use, but very few of these have dampers included, but it is simple to install one. By installing a damper and draft you can keep a reasonable amount of heat in the smoker to cook and smoke the sausage. Completely closed, the smoker built up excessive amounts of heat. By using a hot plate for your source of heat and adjusting the draft and damper, you can maintain 160° or 170° F.

CONTROLS

As mentioned earlier, in prehistoric times and in early America, the meat that was smoked had the moisture removed from it. This was fine when people would barter with each other and the weight of a ham didn't matter as it might be traded for several chickens. It was smoked ham and that was all that mattered in a trade.

Today, however, the words "smokehouse shrink" are of great importance and can determine the success or failure of any size sausage kitchen. With the large volume of meat being smoked today, processors are aware of smokehouse shrink. Since meat is now sold in pounds and ounces, it is obvious why it is important to control smokehouse shrink.

The temperatures to be followed have been designed to cook the meat at a slow and relatively low temperature, in comparison to the way one would normally cook a roast in the oven. Slow cooking and low temperatures prevent smokehouse shrink.

There was a time, when I thought I could speed up the cooking process of this meat by simply increasing the temperature and cooking until the internal temperatures were obtained. I did this, but when I removed the sausage from the cooler and weighed it, I found that I had only 85 lbs. of sausage, instead of the 100 lbs. I originally made.

The need for controls in a smoker, whether for home use or a commercial establishment, are necessary.

When a smoker is built with adjustable controls, you can set your temperature to accommodate any type of meat- beef jerky at 80-90° F, smoked sausages from 120-170° F and semi-dry cured sausages in the 130-145° F range or higher. It is good to have a thermometer on the surface of the smokehouse with the probe on the inside so you can watch and record the temperatures.

Temperatures play an important part in a number of ways. Dry or semi-dry sausages cannot be properly made unless smoker temperatures can be controlled. The slow cooking and low temperatures required improve the keeping qualities of these sausages or hams, which in many cases do not need to be refrigerated.

Lastly, you need a small dial thermometer to check the internal temperature of the meat or sausage so they don't overcook. There simply is no other way to do this. A professional sausage maker would not be without these tools. For home use, at the very least, a sausage maker should have a small dial thermometer, to check internal meat temperature

and also internal smoker temperature.

If you are going to make sausage or cure and smoke meat, there is no question: you should own one of these recording devices. It's the one sure way to insure a good product.



A simple smokehouse control has a range of 80°-220° F. and usually comes with a thermocouple about 4 feet long.

Smokehouse Burner and Control Design

Gas Line

Shut-Off Valve

Solenoid Valve

Pilot Valve

Pilot Burner

Power Cord Wires

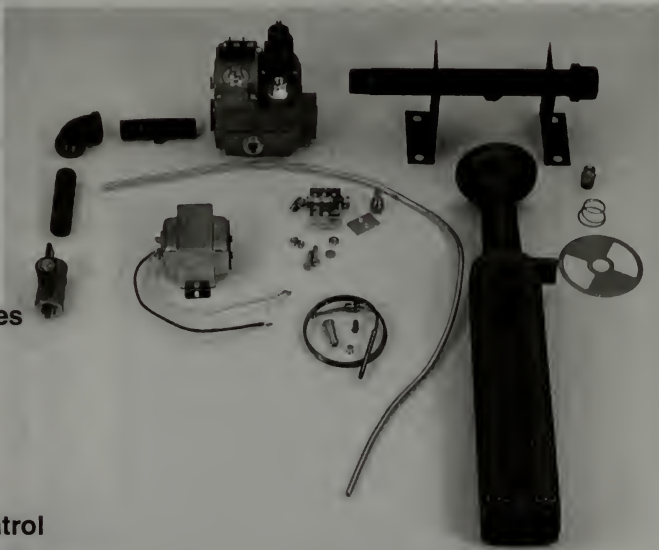
Gas Burner

Heat-Sensor

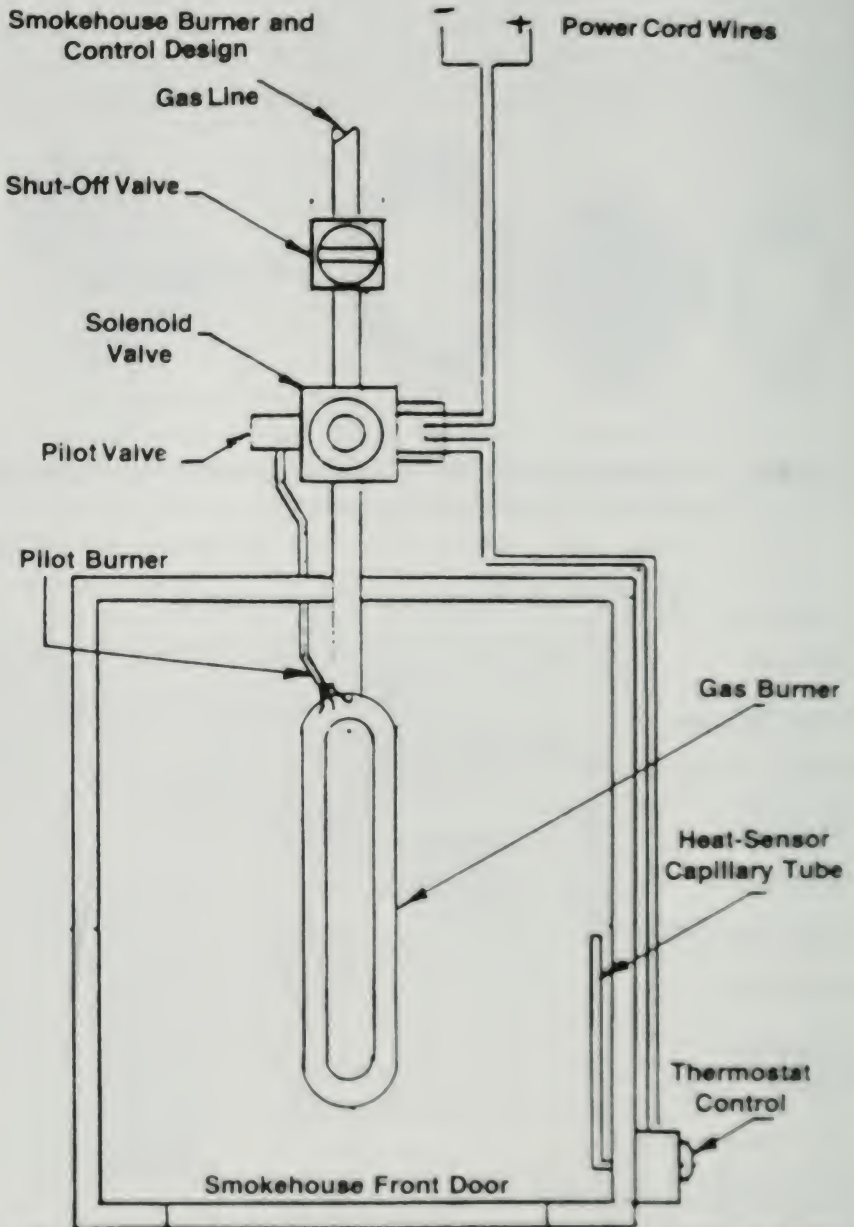
Capillary Tube

Thermostat Control

Smokehouse Front Door



The capillary sensor tube usually hangs in the smokehouse about halfway up from the bottom or just below where the meat will hang. Take note that only the burner pilot light and capillary sensor are placed on the interior of the smokehouse. The rest of the apparatus is constructed to be on the outside of the smokehouse.



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100 lb. electric smoker Mfg. The Sausage Maker, Inc.



100 lb. gas smoker Mfg. The Sausage Maker, Inc.

DAMPER

Cut out a vent hole on top of the freezer; this allows excess moisture and excess heat in your smoker to escape. This hole should be about 6"x6" or 8"x8".

After the vent hole is cut out, you will need a piece of flat metal larger than the dimensions of the hole in order to cover it up. This cover is needed to adjust the amount of heat and smoke that you want in the smoker. If you want you can purchase a 6- or 8-inch diameter sheet metal pipe about 3 feet long with a damper and build a smoke stack.

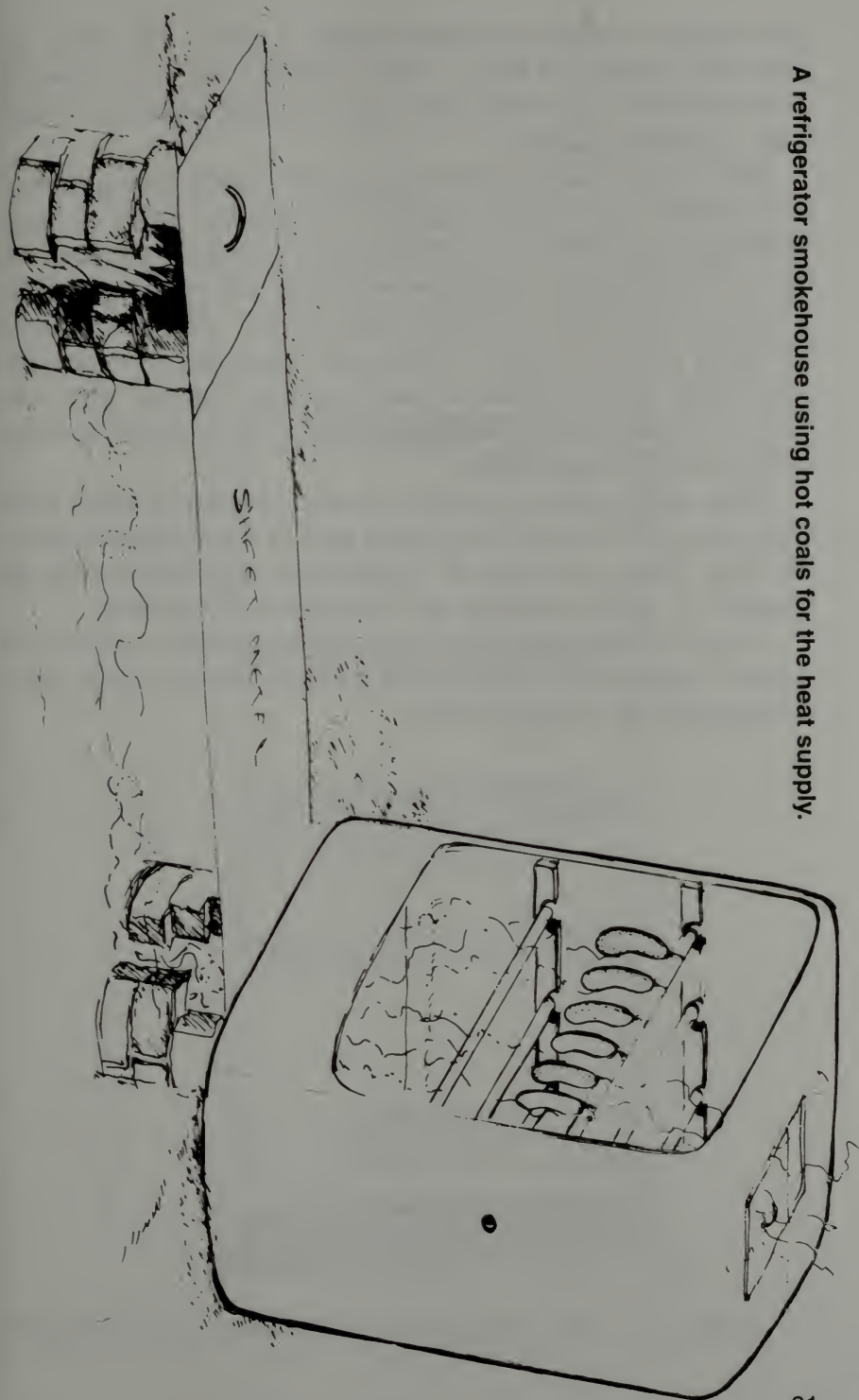
Drill a hole in the side of the smoker that will accommodate a long stem thermometer. This is drilled last for a good reason. After you make your first batch of sausage, you hang the product in your smoker and then drill a hole for the thermometer. It should be in the center of one side of the smoker and should be drilled just below where the sausage will hang. It is from this point up we will try to regulate the heat in the smoker.

If you are a good do-it-yourselfer or have a friend who is a plumber, you could build a smoker using natural gas or propane. Almost all commercial smokers use natural gas, as burning gas has a good volume to it which lifts the heat around and through the meat you are smoking. It also helps lift out the moisture and dry the product faster.

If you live in an area without utilities, you'll have only the fire and its hot coals to do the job for you. This heat can still be controlled without problems by using your thermometer and vent.

It's a good idea during the breaking-in period to use your thermometer and start adjusting the vent to give the desired control you'll be needing. All you need is a fire pit in which to build your fire and a trench that will act as a pipe to carry the smoke and heat to the smoker. If you like, you can line the fire pit with brick and use anything available to cover your trench to act as a pipe. It is important to note that **YOU MUST BUILD THE FIRE PIT ACCORDING TO THE PREVAILING WINDS.** In other words, if the wind blows from the south to the north,

A refrigerator smokehouse using hot coals for the heat supply.

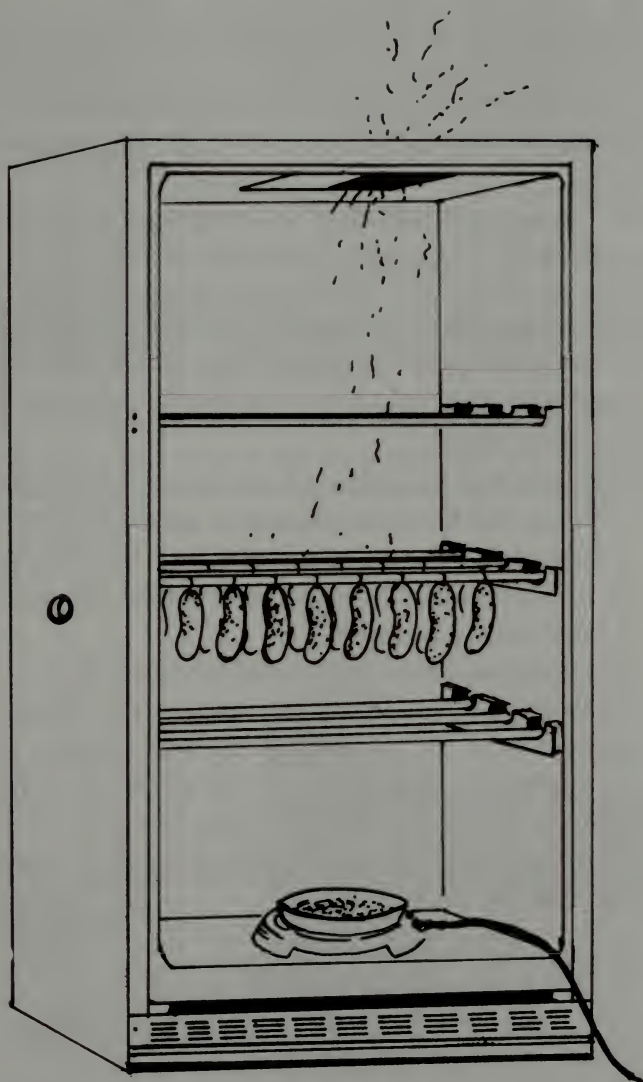


your fire pit is south and the smoker is north. The wind will carry the smoke and heat to the smoker for you. You'll need a cover over the top of the fire since this will serve as a draft when partially opened.

Bolt strips of wood $\frac{3}{4}$ " thick and 2"-3" wide on the side of the smoker. You must be careful to place the strips at least 6"-8" below the ceiling. You should allow a space near the ceiling for the moisture to escape while you are smoking meats. It is also a good idea to notch these $\frac{3}{4}$ "x2". You'll most likely be using round dowels to hang your sausage or meats, so you'll have to be careful so that they don't roll off with your batch of meat into the fire or sawdust. It is an absolute must that you notch these strips.

Also, judge where you want these notches, making sure they are not too close to the back wall of the smokehouse or the door when you close it. Smokestick supports should be spaced 13" apart vertically and notched on 3" centers.

I would advise you not to use old broomstick handles for dowels. These usually have paint on them, which makes them undesirable for hanging meats.



A typical smoker made of an old refrigerator, door is not shown.

HEAT SUPPLY

A hot plate is all that is needed to heat up a smoker of this type; it is advisable to use a stainless steel pan or pot for the smudge. Any other type of metal pot or pan will burn up or melt in a short period of time. When placing the hot plate into the smoker, you do not need to drill any holes for the electric cord. Usually, there is a drain in the old freezer or refrigerator that you can put the cord through. In fact, you can simply place the hot plate into the smoker and let the electric cord drop out through the front door. The door will close without any problems.

The only other item required is some sort of cover for the top of the sawdust. This cover will prevent the sawdust from catching fire, as there will be times when some product you are smoking will be dripping grease. It also helps a great deal when you dampen your sawdust overnight. This helps to make a better smudge, stops your sawdust from burning too fast, and prevents fires.

It is imperative that you give the smoker a breaking-in period. Simply fire up the smoker, close the vent and door and let it smoke for about 3-4 hours. You'll discover that there will be a few spots in the smoker that will leak a little smoke. This is normal, so don't worry about it.

Up to this point we have discussed smokers that use available electricity as well as using old freezers or refrigerators. I think if you look hard at the freezer used to make a smoker, you can now envision that one can be made of almost any type of container you feel will do the job. You may build out of wood, brick or even earth, but be sure that your container is paint free on the inside.



The above is a homemade gas burner made by welding 1 end of a 1-1/2" pipe and drilling 2 rows of holes with about a 1/8" drill bit on 3/8" centers. Oxygen cap on end can be purchased at a plumbing supply house. This pipe was painted white in order to outline the drilled holes to show up better in this photo.



The above is an old bakery oven burner blower gun. The smaller burner in this photo is a simple kitchen stove burner.



The above is a typical homemade smoker built by Robert Shaw of Huntingdon Valley, PA. Notice the long stem thermometer inside to get a temperature reading. Photo by J.W. Robinson.

BARREL-TYPE SMOKERS

My father built a smoker many years ago; he used a 55-gallon drum. He used apple wood for his fire and for the smudge or smoke. Perhaps it is this type of smoker that will serve your needs if you have no electricity or gas available in your area. In fact, it can be used even if you have utilities available.

This type is one of the simpler smokers to build at home, yet it is very effective. You need a 55-gallon steel drum with the top and bottom cut out. You also need a hole at the bottom to be used as a draft. You can hinge the piece already cut out and use it as a little door; about 8"x8" would be a good sized door. This will give you an opening to place more sawdust on the hot coals when required, or to spray a fine mist should the coals flare up.

As in the freezer-type smoker, we still require 3/4"x2" strips of wood so that we can hang our dowels. Again, these strips should be placed at least 6" or 8" from the top so that our cover would not touch meat or sausage that is smoking.

You will also need a cover for the top of the barrel. This cover, placed over the top of the barrel, usually has some nail holes punched into it which allow the moisture to escape.

When you have the barrel portion finished you may then build your fire pit. This pit can be built on top of the ground 8 or 9 bricks high; you then place your barrel on top of them. If you wish, you can provide for a door when using these fire bricks. It is much sturdier, however, for your barrel smoker to be sitting on the ground with your fire pit dug right into the ground.

This type of smoker is capable of smoking about 20 lbs. of sausage, but the one drawback- your fire is close to the meat. You have to build the smoker to be placed over a deep fire pit, so the hot coals will not overcook the bottom part of the product being smoked. With a smoker of this type, it strictly is a hanging-around affair to keep control of the coals and to keep the sawdust from starting to flame.

You might also consider using a 55-gallon drum in the

manner we used the freezer; that is, by building the fire pit at one end, digging a 12' trench and placing the drum at the opposite end. As you can see, all it really takes is a little imagination and a few dollars to build a smokehouse.



A typical smoker using a 55 gallon drum.

You'll need a smokestack to let all the moisture out and to be able to regulate the heat. It's also important to build it large enough to let the heat circulate around your product so it can dry, cook and smoke. It is not necessary that the smoker be insulated. It helps, but is not mandatory. The only other thing needed is a source of heat and you can build it out of brick, earth or wood.

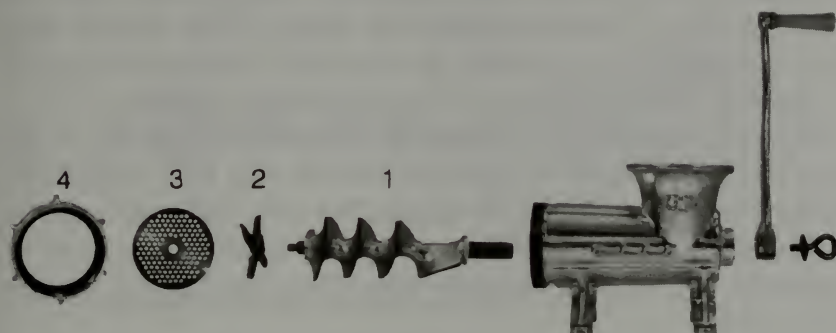
MEAT GRINDERS

HOW TO USE AND THE PROPER CARE

Probably the most problems encountered over the past twenty years is people not knowing how to use their equipment properly. Mostly because there is not adequate information given when they purchase this equipment. Take for instance the simple meat grinder, either electric or hand crank. Usually the manufacturer shows some photos of ground meat or vegetables and that's it. But there are several important things that they simply omit in the instructions because they don't know about them or they assume you, the purchaser, should already know. The hand operated meat grinder, should be washed thoroughly in hot water and dish detergent then rinsed with cold water.

ASSEMBLING A GRINDER

Rinse the hand operated
or electric grinder head
with cold water after washing



A rubber mallet or a wooden block can be used to tighten or remove it.

The proper way to assemble a grinder.

- 1 - Put auger into the grinder head.
- 2 - Next the cutting knife
- 3 - Put the grinding plate against the flat side of the knife
- 4 - Place locking ring on grinder head turning it as tightly as possible.

A hand operated grinder should turn quite hard but when you start grinding the meat, you will find that the meat and fat will lubricate the grinder, and the crank will turn with ease.

As warm meat does not grind cleanly we recommend that all meat for grinding should be cut into small pieces and placed into the freezer to chill to the point of being partially frozen. Meat should always be chilled between 32° and 35° F. for a clean cut.

Questions on grinding have been asked regarding the difference in the consistency of the meat; such as beef or pork vs. venison. In speaking to a butcher friend who does a lot of

deer processing and thirty years of experience, he sees no difference. He re-affirms exactly what I have said — **“CHILL THE MEAT TO WHERE IT IS PARTIALLY FROZEN FOR GRINDING.”**

All meat grinders turn in a clockwise motion. If you're left handed please remember this. We've experienced left handed people telling us the hand operated meat grinder they had was defective, it was mushing the meat. When in fact, they were turning the hand crank in a counter clock wise motion. All electric meat grinders turn in a clockwise motion.

If your meat grinds cleanly at first and then starts to get mushy, that's usually a sign the locking ring was not put on tightly enough and became loose. The only thing you can do is disassemble the grinder, remove the mushy meat, and re-assemble the grinder making sure to put the locking ring on very tightly.

If you can't remove the locking ring by hand, use a rubber mallet and a piece of wood. Tap it loose. **NEVER TAP THE RING WITH A METAL HAMMER BECAUSE MOST OF THESE RINGS ARE MADE OF CAST IRON AND CAN CRACK EASILY.**

CLEANING YOUR HAND GRINDER

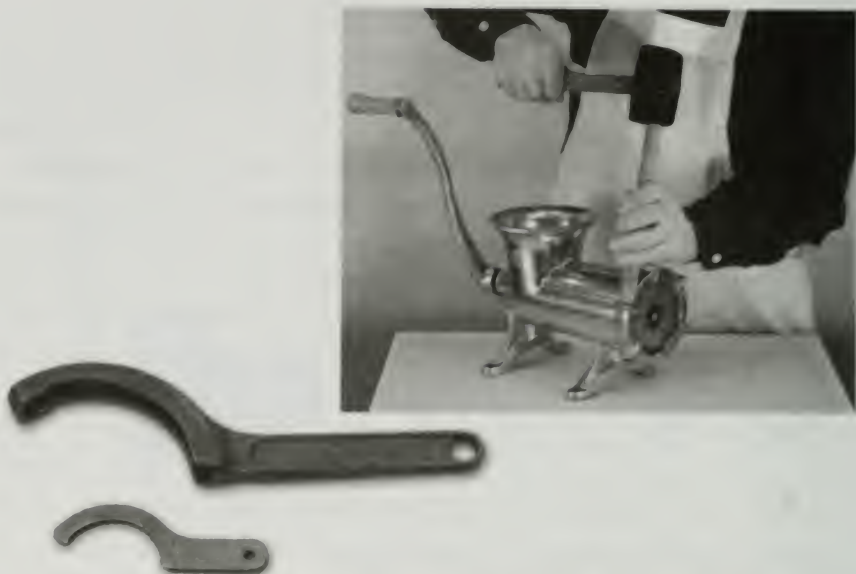
After you are finished grinding the meat, disassemble the grinder. Place all the parts in hot soapy water to remove the grease. All washed parts should be rinsed with hot water and immediately dried with a dish towel. It is imperative that all the parts are coated with a food grade lubrication for storage.



Areas indicated by arrows are bare metal.

These five designated areas of bare metal should always be lubricated with F.D.A. and USDA approved lubricant. A minimal amount of humidity in the air is enough to rust these parts over a period of time and ruin them. It is almost impossible to clean rust from the holes in a 3/16" grinding plate and then it usually has to be discarded. Do not use cooking oils to lubricate grinding parts. Cooking oil is for cooking and not for lubricating over prolonged periods of time. Cooking oil exposed to air gets tacky and rancid which makes cleaning the grinder parts nearly as difficult as if they were rusty.

It is virtually impossible to sharpen the cutting knife or plates because these parts are put through a hardening process. You can replace them for less than it would cost to have them sharpened at a machine shop. It is impossible to properly sharpen them at home because of their hardness.



If you don't own a spanner wrench to tighten or remove the locking ring on your meat grinder, gently tap the wood placed against the ring to tighten or remove the ring.



This type of wrench is rarely seen today except with a large size commercial grinder.

GRINDERS

HAND CRANK & ELECTRIC

Over the years people have motorized hand meat grinders. An electric meat grinder out performs a hand crank meat grinder, especially if you are going to grind 100 lbs. of meat, whether it be pork, beef or venison. Many hunters deal with more than one deer to process and time is of the essence when working with venison. We at the Sausage Maker do not encourage motorizing the #22 or #32 hand crank meat grinders. The main reason is the large size of the opening on these two grinders; it is too dangerous to grind meat with the large mouths on these grinders. You will never see this type of grinder in a commercial butcher market as it is against OSHA (Occupational Safety & Health Administration) regulations.



On the left #10-12 hand crank grinder.

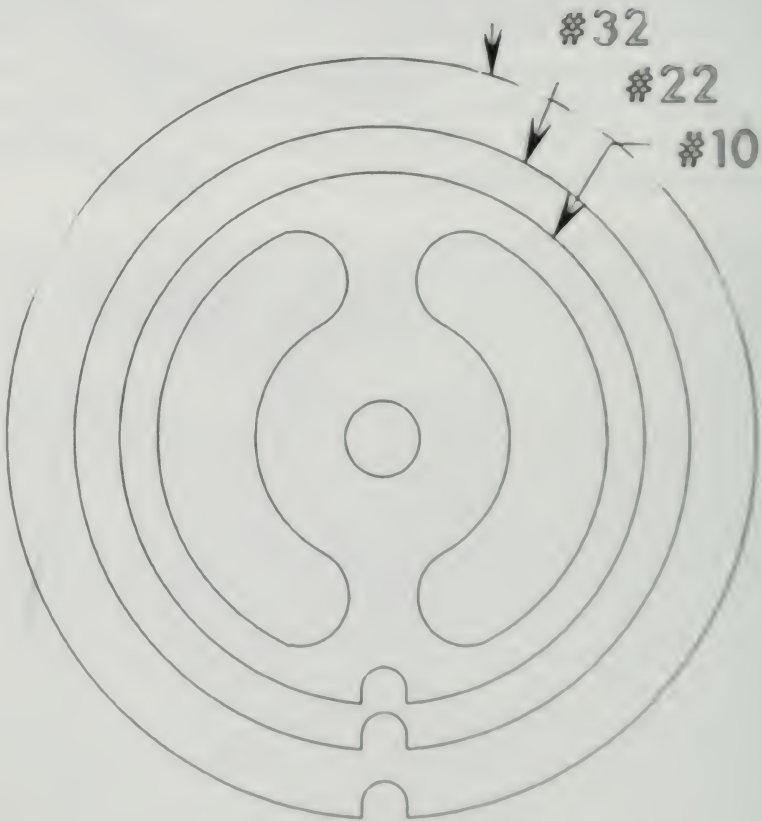
On the right #10-12 head on the electric 2/3 HP meat grinder

Both heads are basically the same

Should a person persist in converting a hand crank meat grinder to electric, we recommend the Sausage Maker #22E, Catalog #62500.

**ACCESSORIES FOR HAND OPERATED
MEAT GRINDERS**

Actual Sizes



Standard Grinding Plate Sizes

A meat grinder, hand operated or electric, is for grinding meat. Used properly, they do a good job. However, some people have decided to add a stuffing tube to these meat grinders, but there are many shortcomings to doing this.

First, these hand operated meat grinders usually come in sizes with a stuffing tube for use with large diameter salami casings. At the opening of the stuffing tube, the diameter is small until it gets to the end where it is two or three times the size.



Hand Operated Meat Grinders



From the beginning the size is 3/4" to 3" at the base. Impossible to make small diameter sausage like breakfast sausage or dried sausage sticks.

Meat grinder companies specialize in manufacturing meat grinders and not sausage stuffers. Consequently, it is impossible to get other sizes as they make only one size to fit all grinders.

The other draw back to stuffing sausage with a smaller diameter sausage tube or even a larger stuffing tube is the amount of time needed to stuff a casing full of meat. If you are hand cranking, it usually takes ten or twenty times as long to stuff an ordinary sausage with this hand crank method although it is a satisfactory way of making sausage for some people.

If you are using an electric meat grinder to stuff sausage you can make this work. The only drawback is the electric machine constantly runs at one speed which is usually fast it and requires two people to operate. One to feed the meat into the grinder and another to control the casing where the meat comes out. It is a little tricky and also very limited in regards to the different size stuffing tubes that are available for this type of operation.

MOTORIZING A HAND CRANK MEAT GRINDER

Over the years, there have been many different ways that people have taken a hand cranked meat grinder and motorized it.

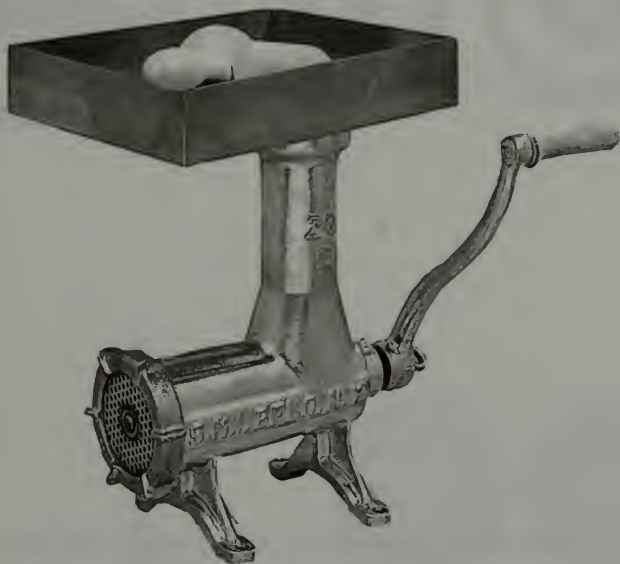
Because the #32 and #22 grinders can be purchased with legs on them, they can be more readily adapted to motorizing. However, these hand cranked meat grinders have always been designed to be cranked by hand.

They usually have plastic bushings because the RPM's (revolution per minute) are so low the bushings will not heat up and melt. However, when you motorize these hand crank grinders with too high of an RPM, the plastic bushings will melt. To replace the plastic bushing with bronze or brass bushing will probably cost twice the amount of the original or, you'll have to keep a supply of plastic bushings on hand. If you motorize your grinder, the key is to have a low RPM design. As a rule, the RPM for a 1/2 HP to 2/3 HP meat grinder can vary from around 150 RPM to 200 RPM up to 250 RPM, with a brass or bronze bushing for the auger to spin on. Anything faster than the RPM's mentioned will cause wear on the

machine and is not recommended.

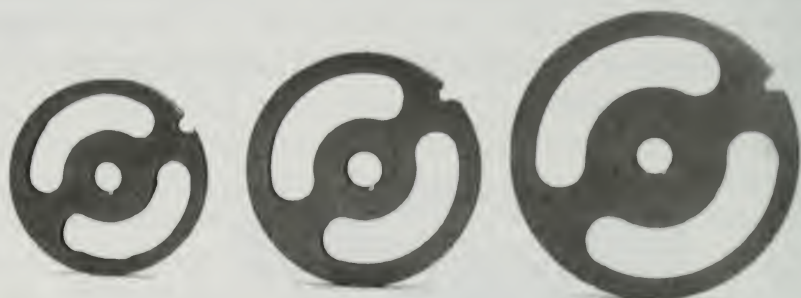
The #32 and #22 hand operated meat grinders are usually the most sought after hand operated meat grinders for motorizing. They have large openings where the meat is placed for grinding.

These large openings on electric motorized grinders are not seen anymore. They are simply illegal and not according to OSHA (Occupational Safety & Health Administration) standards. If you look at the photo below of a #22 hand operated meat grinder, it was built to meet OSHA standards as pointed out in the diameter opening and the length of the neck. Also, it was built with a brass bushing for the auger to prevent wear and it is replaceable.



NOTE: Sausagemaker #22 Long Neck Meat Grinder with a brass bushing

SPACERS FOR STUFFING SAUSAGE WITH AN ELECTRIC GRINDER



Spacers have been around for many years as an accessory to help in stuffing sausage with a hand operated or electric meat grinder.

The purpose of a spacer is to allow less restriction of the meat when you are stuffing meat into a casing with a meat grinder. The meat is first ground, seasoned, then stuffed into a casing. The plate you used to grind the meat with is removed and replaced with a spacer in order to stuff the sausage.



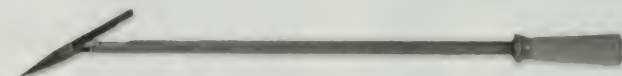
Notice how restricted the meat is going through the plate on the left, compared to how free it comes through the spacer on the right.



In order to get the benefit of using a spacer always be sure you are using a bell shaped stuffing tube. Flat tubes on left is very restrictive.

THE LARDING NEEDLE

To make a lean venison or beef roast a little more flavorful and/or juicer consider using of a larding needle. The larding needle is a long hollow needle with a large eye. Thin strips of fat (such as bacon) are placed into the needle and inserted into a roast at an number of different areas.



CHAPTER III

Natural Casings

INSCA

The International Natural Sausage Casing Association (INSCA) is an association of natural casing producers. This group was formed to promote the use of natural casings. Its main function is to inform the consumer about sausage that is made with natural casings. INSCA can sometimes provide teaching aids such as wall charts and leaflets for educational purposes. INSCA also encourages the use of their logo, as shown below on the packaging of sausage stuffed in natural casings.



INSCA has over 200 members, representing 27 different countries. They don't sell natural casings, only promote their use via TV, radio, magazines and newspapers. They can easily provide the information for purchasing commercial casings in large quantities because they are an association of casing producers.

From time to time we have had occasion to contact INSCA regarding various problems, and they were more than helpful.

NATURAL CASINGS



BEEF BUNGS

Large Bologna.

Almost every sausage maker uses Beef Rungs Caps, one of the most popular items in the entire Beef Casing line.

The size of the Caps is determined by inflating the casing with air until it is distended to the same degree that it would be by stuffing. Then the Cap is usually gauged at the curve.

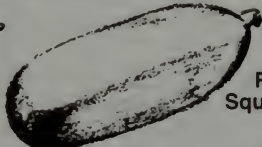
Beef Bungs are used for Capocollo, Veal Sausage, Large Bologna, Lebanon, and Cooked Salami

Grade	CM	Approx. Diameter	Approx Capacity CM	KG	Per Piece	KG
Extra Wide Export Caps	12.5	5" & 6 Over		5.4	12 lbs /up	
Spec. Wide Export Caps	11.2	4 1/2-5"	12.5	4.5	10-12 lbs	5.4
Reg. Export Cap.	10.0	4 -4 1/2"	11.2	3.6	8 -10 lbs	4.5
Nar. Export Caps	8.7	3 1/2-4"	10.0	2.7	6- 8 lbs	3.6
Domestic Caps	11.2	4 1/2" & Over		4.0	9-11 lbs	4.9

BEEF BLADDERS

The largest casings from cattle, beef bladders are oval, and will stuff from 5 to 14 pounds (2.2-6.3 KG) of sausage. They are used chiefly for Minced Specialty and Mortadella, either in their natural oval form, in square molds for sandwich slices, or in the flat pear shaped style.

BEEF BLADDERS



Round and Square Styles

Beef Bladders are used for round Mortadella also round, square, or flat minced specialty

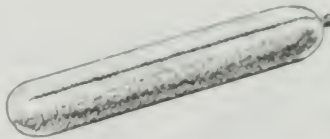
Grade	Kind	CM	Approx Diameter	CM	KG	Approx Capacity Per Piece	KG
Large	Salted	17.5	7" & Over inflated		4.9	11 -14 lbs.	6.3
Med	Salted	15	6"-7" Inflated	17.5	3.1	7 -11 lbs.	4.9
Small	Salted	13.7	5 1/2"-6" Inflated	15	2.2	5- 7 lbs.	3.1
Small	Dried	20	8"-10" Deflated	25	2.2	5-7 lbs.	3.1

BEEF MIDDLE



Before Stuffing

Bologna in ...



Sewed
Beef Middle

Beef Middles can be used satisfactorily for Leona Style Sausage, all other types of Bologna, Dry and Semi dry Cervelats, Dry and Cooked Salami and Veal Sausage

SEWED BEEF MIDDLES

Kind	CM	Width	CM	Length	Approx. Stuffing Capacity	CM	Per Piece	KG
Single Wall	7.5	3 31/2"	8.7	4.5	8-20"	5.0	51/1 61/4 lbs.	2.8
Single Wall	8.7	3 31/2 4	10.0	4.5	18-20"	5.0	61/4-63/4 1 lbs.	3.0
Single Wall	10.0	4 41/2 "	11.2	4.5	18-20"	5.0	7-71/2 lbs.	3.3

READY-TO-USE BEEF MIDDLES

Sewed Across One End

CMWidth	CM	CM	Length	CM	Approx Capacity Per Piece	KG
4 31 3/4"-2"	5.0	4.5	18-20"	50	1 3/4 lbs.	.78
5 02"-2 1/4"	5.6	4.5	18-20"	50	2 1/4 lbs.	8.0
5 62 1/4"-2 1/2"	6.2	4.5	18-20"	50	2 1/2 lbs.	1.1
6 22 1/2"-2 3/4"	6.8	4.5	18-20"	50	2 3/4 lbs.	1.2
6 52 3/4"-3"	7.5	4.5	18-20"	50	3 lbs.	1.3

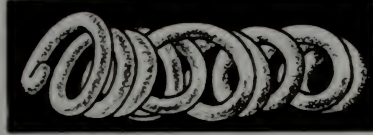
BEEF MIDDLES

Grade	CM	Approx Diameter	CM	KG	Approx Capacity Per Set	KG
Extra Wide	6.2	2 1/2" & over		40.5	90-100 lbs.	45
Spec Wide	5.6	2 1/4"-2 1/2"	6.2	36	80-90 lbs.	40.5
Medium	5.0	2"-2 1/4"	5.6	24	55-65 lbs.	29
Narrow	5.0	2 & Down		20	45-55 lbs.	24

Beef Middles are measured in sets of 57 feet (17.3 M) each

BEEF ROUNDS

These casings derive their name from their "ring" or "round" characteristic. There are two general classifications: namely, "Export" Grade and "Domestic" grade. Beef Rounds are usually considered among the finest on the market because they are liberally measured, accurately calibrated, closely cleaned and fatted, and all scored, tender, and waste material is removed



Ring Bologna



Beef Rounds are used for Ring Bologna, Ring Liver Sausage, Mettwurst, Polish Sausage, Blood Sausage, Kishka, and Holsteiner.

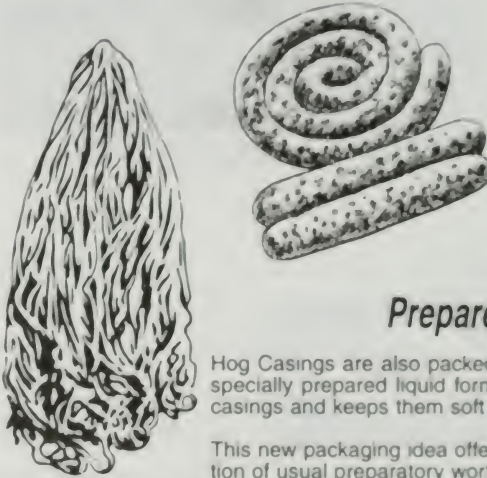
BEEF ROUNDS

Stuffing capacities indicated are approximate green weights and cannot be guaranteed on account of natural variation of the product.

Beef Rounds are measured into sets of 100 feet (30.4 M) each.

Grade	Average Approx. Diameter	KG	Average Approx Cape City Per Set	KG
Ex. Wide Domestic	44MM & Over	38	85-95 lbs.	43
Wide Domestic	40-44MM	34	75-85 lbs.	38
Med. Domestic	40MM & Down	27	60-70 lbs.	31
Ex. Wide Export	44MM & Over	38	85-95 lbs.	43
Wide Export	40-44MM	34	75-85 lbs.	38
Spec. Wide Export	37-40MM	31	70-80 lbs.	36
Medium Export	35-38MM	29	65-70 lbs.	31
Narrow Export	28-35MM	24	55-65 lbs.	29

HOG CASINGS



Hog casings for Country Style Sausage, linked Hog Sausage, Large Frankfurts, Kishka, Kielbasa and Pepperoni.

Prepared-Ready-to-Use

Hog Casings are also packed 1 bundle per plastic bag with a specially prepared liquid formula. This solution preserves the casings and keeps them soft and pliable for immediate filling.

This new packaging idea offers labor savings through elimination of usual preparatory work associated with salted product.

HOG CASINGS

Grade	Approx. Diameter	KG	Approx. Capacity Per Bundle	KG	Average Bundles Per Tierce
Narrow	32MM/down	40.5	90-100 ins.	45	335
Medium	32-35MM	47	105-115 lbs.	52	325
English Medic	35-38MM	52	115-125 lbs.	56	310
Wide	38-42MM	56	125-135 lbs.	61	300
Spec. Wide	42-44MM	59	130-14 in.	63	290
Extra Wide	44MM/over	61	135-150 lbs.	67	280
Ivied Short	35MM/down	36	80-90 lbs.	45	305
Wide Short	35MM/over	43	95-105 lbs.	47	285

Hog casings are measured into bundles of 100 yards (30.4 M) each. Shorts are 3 to 6 foot (90-180 CM) lengths.

HOG BUNGS



REGULAR HOG BUNGS . .

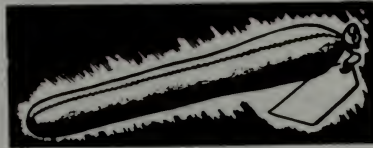
Regular Hog Bungs are normally put up as Medium Prime, Large Prime, Export, and Sow selections, each grade denoting a definite size. These are known as "sales grades." The selection is determined by inflating the bung with air, then calibrating it about 22 inches (55 CM) from the large or "crown" end. The various sales grades of Regular Bungs are distinguishable by the natural taper from the "crown" end. They are usually sold and used cut in 34 inch (85 CM) lengths- They are used chiefly for Liver Sausage and Braunschweiger.

SEWED HOG BUNGS . . .

Sewed Hog Bungs are produced in doublewalled and single-walled varieties. Both varieties are made by sewing two pieces of the smaller sizes of Regular Hog Bungs to obtain a larger, more uniform, finished product. Being "tailor Made," so to speak, Sewed Hog Bungs can be obtained in almost any shape or size. The doublewalled type is used almost exclusively for Liver Sausage, Braunschweiger, and Genoa; the single walled for Thuringer and hard Cervelats.

REGULAR HOG BUNGS

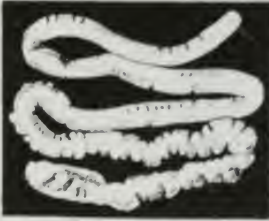
Grade	CM	MM	Approx Diameter	MM	Capacity Per Piece	KG
Sow, 32" cut	80	56	2 1/4"/Over		5 1/2 lbs.	2.4
Export, Sow-in, 32" cut	80	53	2 1/16"/Over		5 lbs.	2.2
Export, sow-out, 32" cut	80	53	2 1/16-2 1/4"	56	4 1/2 lbs.	2.0
Large Prime, 32" cut	80	47	1 15/16-2 1/16"	53	4 lbs.	1.8
Medium Prime, 32" cut	80	45	1 18/16-1 15/16"	47	3 1/2 lbs.	1.5
Brok. Short, (20-34" long) (50-85 CM)	47	1	15/16"/Over	47	3 1/2 lbs.	1.5



SEWED HOG BUNGS

Used For	CM	Width	CM	CM	Length	CM	KG	Approx. Stfg. Cap.	KG
Viskon Lined Sewed Hog Buns									
Liver Saus.	8.7	3 1/2-3 3/4"	9.3	75	30-32"	80	3.1	7-8 lbs.	3.6
Liver Saus.	7.5	3 -3 1/2"	8.7	75	30-32"	80	2.5	5 3/4-6 3/4 lbs.	3.0
Liver Saus.	6.2	2 1/2"-3"	7.5	75	30-32"	80	2.3	5 1/4-5 3/4 lbs.	2.5
Double Wall-Combined Hog Bung End and Beef Casing Lined.									
Liver Saus.	8.7	3 1/2-3 3/4"	9.3	75	30-32"	80	3.8	8 1/2-10 lbs.	4.5
Liver Saus.	8.1	3 1/4 -3 1/2"	8.7	75	30-32"	80	3.3	7 1/2-8 lbs.	3.6
Liver Saus.	7.5	3-3 1/4"	5.1	75	30-32"	80	2.9	6 1/2-7 lbs.	3.1
Liver Saus.	6.2	2 3/4-3"	7.5	75	30-32"	80	2.4	5 1/2-6 lbs.	2.9
Liver Saus.	6.2	2 1/2-2 3/4"	6.7	75	30-32"	80	2.2	5-5 1/2 lbs.	2.4
Double Wall-Hog Bung Ends									
Genoa	8.7	3 1/2-3 3/4"	9.3		20"	50	2.2	5-5 1/2 lbs.	2.4
Genoa	9.3	3 3/4-4"	10		20"	50	2.4	5 1/2-6 lbs.	2.9
Single Wall									
Thuringer	8.7	3 1/2-4"	10	75	30-32"	80	3.3	7 1/2-8 1/2 lbs.	3.8
Thuringer	7.5	3-3 1/2"	8.7	75	30-32"	80	2.4	6-7 lbs.	3.1
Thuringer	6.2	2 1/2-3"	7.5	75	30-32"	80	2.2	5-6 lbs.	2.9

HOG MIDDLE (CURLY)



Before Stuffing



After Stuffing:
Liver Sausage
and Italian
Salami.

While Hog Middles are not so well known as other casings, they are used in large quantities in many territories. They are put up as:

Hog Middles with Caps Off

Hog Middles Caps

The Hog Middle is the same item that is known as "Chitterlings."

CAREFUL PROCESSING FOR HIGH QUALITY

Hog Middles-Caps Off-are not put up to definite specifications as are other casing items, but selected on the basis of saving only the choice, mediumsized pieces. Each piece is cut in about seven-foot lengths and is called a "set."

Hog Middles are easily recognizable by their curly appearance, which also distinguishes the products for which they are used. These are: Certain types of Italian Salami, such as Frisses; Liver Sausage; and Braunschweiger.

HOG STOMACHS

Hogs Stomachs are put up in 2 sizes-medium which will stuff approximately 5 lbs. (2.2 KG) of formula and large which will stuff approximately 7 lbs. (3.1 KG).

The principle use of this item is for Headcheese, Souse and Blood Sausage.



After Stuffing

SHEEP CASINGS

Sheep casings, as the name implies, come from lambs and sheep. They are used principally for pork sausage and frankfurts.

Sheep Casings ...

are strong yet extremely tender eating. Promptness of handling, modern machinery, thorough cleaning, all combine to produce casings that are strong, clear, free of weak spots, holes, and other imperfections.

Sheep Casings are ...

of a good, white color. This permits proper smoking or coloring of the frankfurts and gives the desired finish to the pork sausage.



After Stuffing:
Fresh Pork Sausage
(front) and Frankfurts.



Prepared-Ready-to-Use

Sheep casings are also usually packaged in a specially prepared liquid solution, 1 or 2 hanks per plastic bag. The solution acts as a preservative, also keeps the casings soft and pliable for immediate filling.

This modern packaging method offers labor savings through elimination of the customary preparation work involved with salted stock.

SHEEP CASINGS

Grade	Approx. Diameter	KG	Approx. Capacity Per Hank	KG
Narrow	16-18 MM	14.8	33-36 lbs.	16.2
Str. Medium	18-20 MM	17.1	38-41 lbs.	18.4
Med. Wide	20-22 MM	21.1	47-52 lbs.	23.4
Str. Wide	22-24 MM	24.7	55-60 lbs.	27
Spec. Wide	24-26 MM	27	60-64 lbs.	29
Extra Wide	26/over MM	29	64-70 lbs.	32
Shorts-3 to 6-foot lengths				
Str. Medium	18-20 MM	15	34-36 lbs.	16.2
Med. Wide	20-22 MM	18	40-45 lbs.	20
Str. Wide	22-24 MM	20	45-50 lbs.	22
Spec. Wide	24-Up	22	50-54 lbs.	24
Extra Wide	26/over MM	29	64-70 lbs.	32
Sprinklers (Pork Sausage Only)				
Wide	22/over MM	23	53-57 lbs.	26
Medium	18-22 MM	18	40-45 lbs.	20

Sheep Casings are measured into hanks of 100 yards (30.4 M) each.

NATURAL CASINGS

Surprising as it may seem, there aren't many books today that deal with the subject of casings for the making of sausage. The only way to obtain information is from the people who sell these products, and that mostly is word-of-mouth.

In light of the incredible amounts of sausage that are made in this country alone, one would think there would be a wealth of information dealing with this particular subject. Instead, there virtually is no information available anywhere. In the next few pages, you will be surprised to learn about the many types of natural casings that are available today. It truly is an industry in itself.

A casing is calibrated by inflating it with air until it is distended to the same dimension that it would be by stuffing it with meat. The larger casings used for bologna or salami usually are measured in inches or millimeters. For the most part, all casings today are measured using the metric system.

Anyone thinking about opening a sausage kitchen would do well to start out using natural casings. There are a number of good reasons for this. To begin with, natural casings are readily available in every section of the United States, and they are available in small quantities, commonly known as hanks or bundles. These hanks of casings can usually be relied on to make a specific amount of sausage.

For example, the 32-35mm up to 40-42mm sizes in the hog casings can be used to make from 100-125 lbs. of sausage per hank. However, when using 22-24mm to 24-26mm lamb casings you will find that 1 hank only will give you about 50-60 lbs. of sausage. Generally speaking, the small-size casing only allows you to stuff half the amount of meat into a bundle of casings and will cost you twice as much when you purchase it. Since lamb is not the primary meat one sees in a meat counter today, it is understandable that these casings will cost more.

More and more sausage makers are using the 32-35mm hog casings to make a breakfast sausage, as you can actually stuff twice the amount of meat into one hank of these casings. Theoretically speaking, you are getting twice as much for

your money.

Another advantage to using natural casings is that they can be linked with relative ease. With little practice or effort you can make sausage to specific orders (4-5 links to the pound). For home use, the natural salted casings just can't be beat. The casings are sold in bundles that make up to 120 lbs. of meat, but not many people would make this amount of sausage at one time. The unused portion of the natural casings are then repacked in purified salt and can be kept for an indefinite period of time under refrigeration. Never use iodized salt.

However, these casings are not without their drawbacks. To the novice unraveling these casings, they have a tendency to tangle and become knotted. With patience you can overcome this problem with relative ease. Natural casings usually are packed in salt, the individual casing has to be flushed out with water and rinsed on the outside as well. Sausage kitchens no longer use this type of casing as it is time-consuming and costly, but the salted casings are still best for home use.

For the commercial sausage kitchen, preflushed natural casings are available. They come packed in sealed plastic bags filled with solution. The solution helps to keep the casing soft, pliable and ready for immediate filling and they seldom knot up as they are removed from the container one at a time.

For stuffing sausage in a commercial sausage kitchen, this particular type of casing is cheaper to use than salted casings. The reasons are especially obvious when the preflushed bundles cost only pennies more. The preflushed casings have a shorter shelf life- about 30-40 days under refrigeration-so this type of casing is not very good for home use unless you plan to make a large amount of sausage and use them up.

On the other hand, a natural casing is great for making dry or semi-dry salami or sausages. When the natural casings are stuffed with meat they will shrink equally with the meat while in the drying stage.

This cannot be said for synthetic casings. The meat packed into a synthetic casing would dry, but the casing would

not. You then would have a shriveled-up looking sausage, not very appetizing. But there are synthetic casings available today that will shrink away proportionately with the meat while in the drying stage.

SALTED CASINGS

Salted casings come from all over the world: China, Australia, New Zealand, Argentina, etc. The main reason for this is the fact that natural casings produced in the United States are used up by the meat packers themselves, and there aren't enough to go around, so the rest of the natural casings are imported.

Salted casings have a very long shelf life when stored properly. These casings come to us in the cargo hulls of ocean-going vessels and are not refrigerated. The vessels sometimes take two months to arrive in our ports. The casings are refrigerated as soon as they arrive.

It boils down to this: an unrefrigerated casing has a life expectancy of around six months. Put in a refrigerator, this same casing packed liberally in salt has an indefinite shelf life. In other words, it will last until it is used up. Store casings at 40-45° F.

Unrefrigerated, these salted casings quickly begin to give off a strong odor even though they themselves are not spoiled. Put them back under refrigeration and this odor, for the most part, disappears.

TOUGH CASINGS

Occasionally, some people do have problems with tough natural casings. By their very nature, natural casings can sometimes be tough. Salt itself can toughen the casings.

For home use, rinsing and flushing a casing and then refrigerating overnight will help. This seems to remove more salt from the casing itself, which in turn helps to tenderize it. If you don't mind a little extra work, you can flush the casings again before their use; this may also help. It is quite difficult to pinpoint why natural casing are sometimes tough. Even the

food the animal ate could have a bearing on this problem.

It is equally important not to put stuffed sausage in a hot smokehouse. The gradual raising of the temperature will prevent toughening of the sausage. Too much heat is almost a guarantee that the casings will be tough.

Generally speaking most recipes in this book call for internal temperatures of 152°F to 160°F to be obtained internally. Depending on outside temperatures, sometimes your sausage takes on a nice brown color faster in warmer weather. Then you have two choices on how to reach the internal temperature of 152°F. The first choice is fill a pan with water and place into the smoker. As your sausage is still smoking and cooking at 160°F trying to obtain 152°F internally. The water in the pan will keep boiling and produce humidity in your smoker. This humidity should prevent the casing from drying out and becoming tough, either natural or collagen. It can take four to six hours to cook sausage to an internal temperature of 152°F by this method.

The other option is to steam cook the sausage. Once you obtain the desired color, put hot water in a pan and close the door. In order to not overcook a sausage or salami there are some rules that must be adhered to:

#1 When steam cooking sausage in hog or beef casings, 29 mm up to 42 mm, the internal temperature of the sausage must be at least 120°F before you start steam cooking. This process will tenderize the casing with the hot steam.

#2 For steam cooking up to a 3-1/2" diameter salami, the internal temperature must be at least 130°F before you start steam cooking.

The above information is based on using a Sausage Maker, Inc. 20 lb. capacity smokehouse. However, even with a 100 lb. or 300 lb. smoker, the principal is the same. Obviously the bigger the smoker, the more sophisticated the equipment becomes. Usually the large smokers have smoke generators that can be controlled to off and on, as well as steam generate.

When placing a casing on a stuffing horn, it should always go on loosely. If you have difficulty placing the casing on the

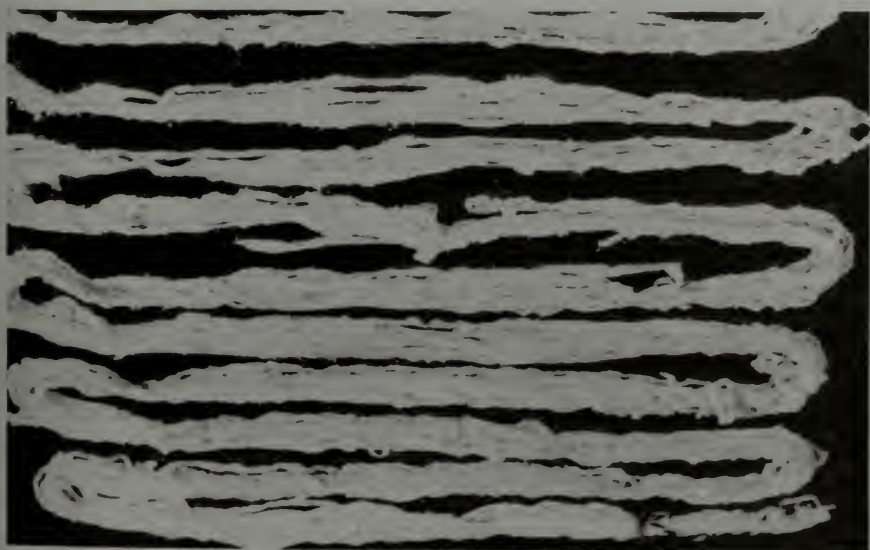
nozzle, it is an indication that the nozzle is too large. The casings must go on very loosely. Forcing a casing on an oversized nozzle will almost always result in breakage and/or the casing not coming off the nozzle properly. A good rule of thumb is that a 1/2" nozzle is used with casings in the range of 22-28mm, and 3/4" nozzle should be used for the 30-36mm range, and a 1" nozzle should be used for casings over 38mm.

Improper stuffing of the sausage itself can also make a person believe the casing is tough when in fact it is not. Sausage should always be stuffed as firmly as possible.

Finally, never put a sausage into boiling water. Instead, start cooking in cold water, bringing the temperature up gradually. Bring to a boil and then simmer until cooked.



AN ASSORTMENT OF CASINGS. The small hank of casings are lamb casings. The large bundle is a hank of hog casings. Compare the fine strands of the lamb as opposite the hog casings. The bundle of casings in the plastic bag is of the preflushed variety. These casings come packed in a solution and have a shelf life of 30 to 40 days. Unless you plan to make at least 100 pounds of sausage, these casings are not practical for home use. Salted casings can be kept for years packed in salt, under refrigeration.



The first step in unraveling casings is to have the whole bundle stretched out on a long table. All casings come tied on one end with cotton twine. In using a long table, the casings are unraveled easier one at a time, and there is less chance for knotting.

FLUSHING SALTED CASINGS

In making sausage while using a natural salted casing, flushing the casings is the first step. To save aggravation, a bundle of casings should be unraveled on as long a table as possible. Since a single strand of the casing can be as long as 12 feet, the table or platform to be used should be at least 7-8 feet long. The casings can be unraveled much easier and there will be less knotting.

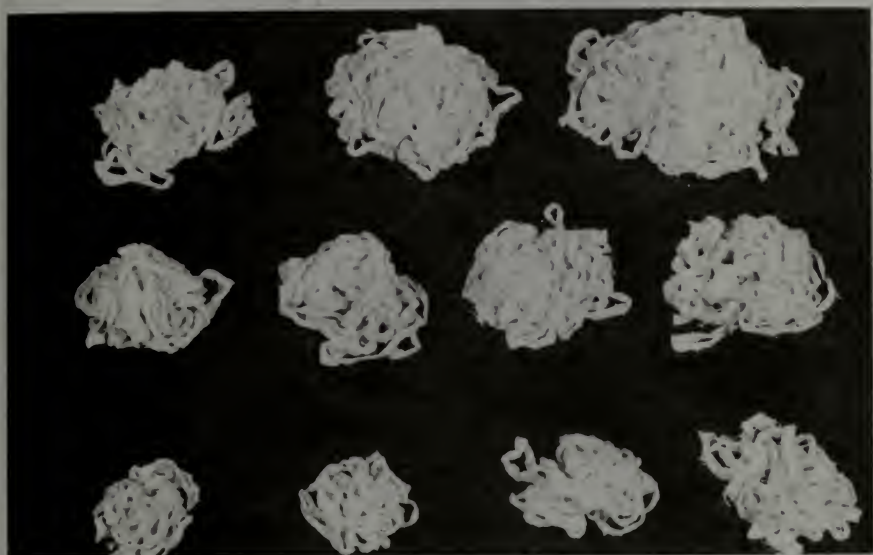
After all the casings are unraveled and set in stacks, the sink should be partially filled with water. In addition, a suitable container (about 2 qts.) to hold one bundle of casings should also be half- filled with water.

The casings are then flushed one at a time. The casing is opened at one end and placed under the faucet in the sink. A suitable amount of water is allowed to enter into the opening and is then flushed out the other end.

The flushed casing then is placed into the container, allowing one end of the casing to hang out over the side of the container. When the casings all are flushed, put them in the cooler until they are ready for use. If possible, use a container that has a cover with it. The container should be filled the rest of the way with cold water, and the cover then placed over the top. This prevents the casings from drying out.

When you actually use the casing, it is good practice to place more water into it before placing it on the stuffer horn. The casing should be allowed to come off the stuffer horn as easily as it went on.

Be liberal with the water when using natural casings. If you are not, you will find that the casing will stick to the stuffer horn and you will wind up breaking the casings. In addition, you will have an excessive amount of air pockets in the sausage. Many times these cannot be avoided, so be sure you pin prick as many of these air pockets as you can.



Casings in small stacks after being unraveled.



When flushing casings, the outside should also be washed. This usually takes care of itself by partially filling a container or sink with water. As you are filling the casing with water, the other part is dropped into a container and washes by itself as the water is being flushed through the inside.



When flushing a salted casing, allow for 12 to 18 inches of water to enter the casing before flushing from one end to the other.



After filling the casing with water, be sure all water and air is removed otherwise the casing will float in the container and become knotted with the other casings. Flushed casings are placed into a container one on top of the other to prevent knotting. After casings are flushed and placed into the container, fill with a very slow stream of water. A quick fill of water will cause the flushed casings to tangle and become knotted.



The proper way for casings to look after being placed into a container.



A container with a cover should be used if you are going to store casings overnight. Storing casings overnight before use tends to make the casings more tender.

If you are sure that you are going to use the whole hank of casings to make sausage, there is even an easier way to clean them. First, remove the cotton string that holds the whole bundle together. Find the colored thread that holds the strands of casings together and remove it. (These different colors indicate size) Then place the casings in a large pot or container filled with cold water. If you wish you may rinse the casings and refill the container with water, about half full. Let the casings set in water, in a few hours the casings will become slippery and you'll be able to pull them out one at a time. If you can leave the casings in this water overnight it'll be better yet.

If you don't use all of the casings, they can be resalted instead of discarded. Simply squeeze all the water out of the casing, don't rush it. Let them lay in a noodle colander to drip dry, squeezing the water out from time to time. When fairly dry, sprinkle salt (**DO NOT USE IODIZED SALT, PURIFIED WOULD BE THE BEST**) on casings, place in a container and refrigerate. Don't over do it with the salt. Take notice how salted these casings were before you got started.

CHAPTER IV

Collagen and Synthetic Fibrous Casings

COLLAGEN CASINGS

What is a collagen casing? There are a few people using them today, but not many people know what they really are. A great many people actually call a collagen casing a "synthetic casing." It is not; a collagen casing is exactly what the name implies-collagen-and it is edible.

These casings are made from the hides of cattle. Once the flesh and fat are removed from the inside, the hair is then removed from the outside. The hide is then split in half by a special machine. The hair side is used for leather, and the flesh side or corium layer is used in the manufacture of collagen casings. This raw material is ground and swelled in an acid, then sieved and filtered and extruded into casings. Following this simple explanation of collagen casings, I would like to explain the reasons for their use today.

Before collagen casings came into being, the sausage makers were confronted with several major problems. In servicing the hotels, restaurants, and various institutional areas (schools, hospitals, prisons, etc.) it was found that their products were not readily acceptable, since portion control plays such a big part in today's world. The meat processors could supply any size hamburger, steak, or other meats as well.

It was just natural then, that sausage would have to come under portion control as well. Because natural casings are erratic in size, it was difficult, if not impossible, to give any kind of portion control, especially when using an automatic sausage linking machine. This machine can give you correct length of the sausage but never the correct weight.

When natural casings are purchased in bundles (or hanks) they clearly specify the size you are buying. For Italian sausage you would get 32-35mm; for Polish sausage you get 38-42mm. Notice that you are getting four different sizes when you order one hank. The lamb casings used for breakfast sausage also come in several different sizes per bundle.

In either case, the natural casing of animals differ in size and cannot be controlled. This, of course, is hardly noticeable to the housewife. With an institution or restaurant it's a different story. A housewife simply buys by the pound; a restaurant-

teur wants to know how many to a pound. The restaurateur will feed a certain amount of people by the pound. They require that each person has the same amount as the other when they order the same type of dinner plate.

No matter what the product, each plate has a certain number of ounces of meat on it; the owner then can easily figure out his profit. In addition, the dinner plates go out in an equal size. The patty-making machines today can give you any size that you require in a hamburger or breakfast patty: 2 to the pound, 3-4 and even 9-10 to the pound. You may get as little as you want or as much as you like to the pound.

The collagen casing today gives the restaurants and institutions the control they want. A hospital knows that to prepare eight breakfasts, it takes 1 pound of breakfast sausage to do the job. Most breakfasts are served with two breakfast sausages, and the sausages generally are made 16 to the pound. In addition, they can better control how much product they are ordering. Getting to the larger-type sausages (i.e. Polish sausage or knockwurst), portion control becomes even more critical.

The uniformity of the collagen casings certainly is a major factor for consideration by anyone making large amounts of sausage. This uniformity has allowed the sausage makers to be able to sell their products anywhere and enable them to secure more business.

Because of the uniformity of the collagen casings today, the result is superior machinability. Practically all the linking machines on the market today can use collagen casings. The ability to produce uniform links at high speed obviously results in an increased flow of product, larger volumes, and less time. Naturally, this decreases the cost of production with great consistency. The sizes available today range from 14mm to 45mm.



Collagen casings.

The versatility of these casings makes them usable to any smoking process. In many instances, the smoking cycles may be shortened because of the rapid uptake of the smoke color. This in turn leads to less smokehouse shrink, thereby increasing the profit picture. Collagen casings are taken right from the box to the stuffer horn without additional washing or handling. They already are clean and sanitary and available for any type sausage you may want to process.

Collagen casings, since their inception, have only been used by the commercial sausage kitchens and are available in various lengths. After stuffing a casing full of meat, it's like having a 16 or 20-foot iron pipe on your table full of meat. It has always taken the use of an automatic linking machine to form the link and tie it off with string. Straight collagen casings cannot be linked manually by twisting, as they simply will not hold the link; they always unravel. By the same token, these casings can be tied off in links manually if you don't mind the extra work involved by doing the tying.

CURVED COLLAGEN CASINGS

As with all technology, advances always are being made, and collagen casings are no exception. They are now available with a natural curve extruded into them. As the meat is stuffed into these casings, they immediately are curved and ready to be placed on a smokehouse stick. In addition, they can even be linked into 6"-7" links without unraveling. Obviously, these casings now are practical for the smaller sausage kitchens or home use.

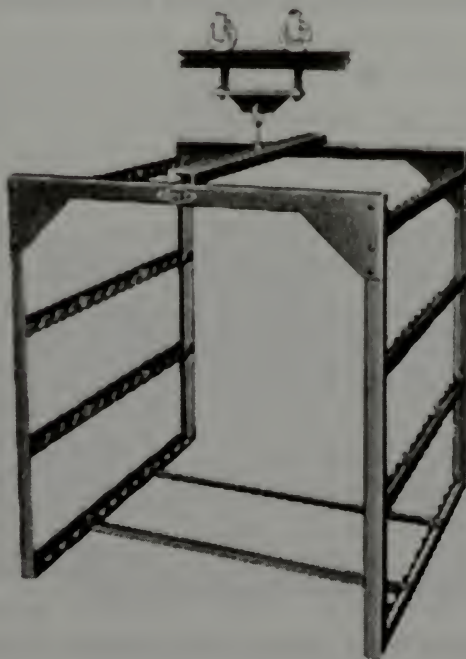
For years many sausage makers as well as the do-it-yourselfers have been looking for casings that already have a brown color to them. I was one of these people when I first got into sausage making on a professional basis. I felt we could

do away with smoking completely or get a much better job done in less time.

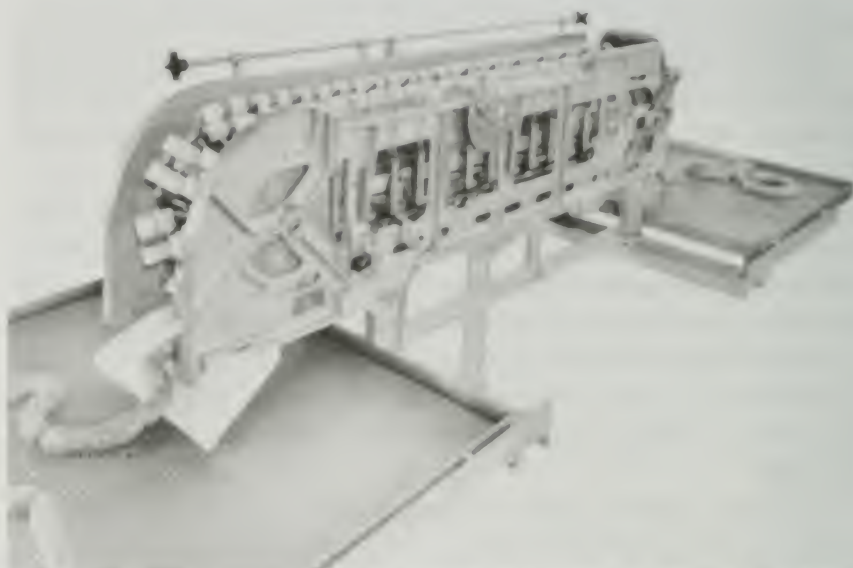
Unfortunately, at the time, collagen casings still were not developed. However, a breakthrough has been made, and collagen casings now are available in Various colors. You now can bypass the smokehouse if you like.

By the same token, if you still prefer to use the smokehouse, as I do, you will be amazed at the deep mahogany colors that can be attained. Best of all, these colors do not fade away and hold up for longer periods of time. This makes the products more saleable as well. Collagen casings in the range of 30mm and over should only be used for smoked or dry-cured sausage. They are not desirable for stuffing fresh sausage.

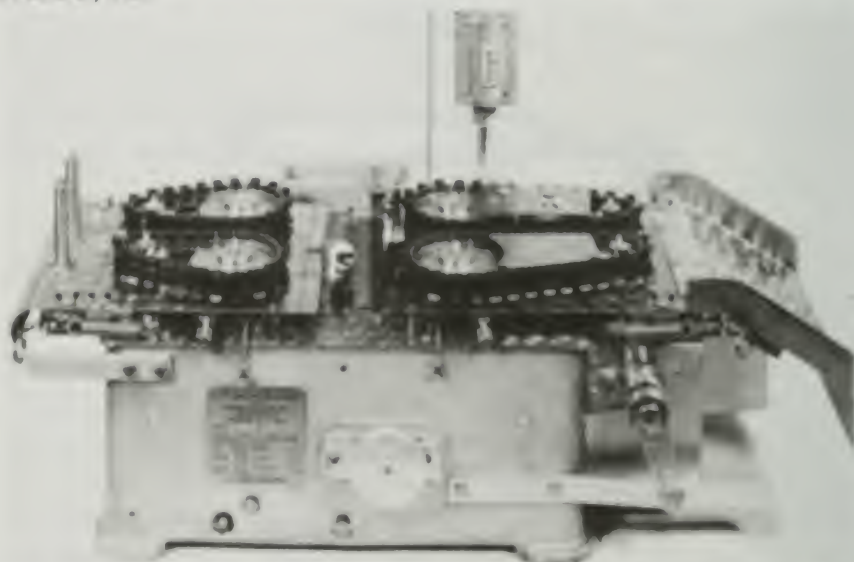
It is important to note that collagen casings require refrigeration, just as natural casings do. These casings need only be kept at 50 degrees F. or lower, but without it they will become brittle.



A smokehouse cage. Generally used with an overhead rail, can also be used for sausage or meats.



FAMCO sausage linker. This linking machine is used for linking breakfast sausage links. It also has the feature of cutting the sausage in pairs or single links as it discharges the sausage. Manufactured by FAMCO, Inc.



TY-LINKER actually uses a twine to tie off each sausage after it is linked. The linker is adjustable to the length of sausage to be linked. Can be used with either natural or collagen casings in the 40-42 MM range. Manufactured by Linker Machines, Inc.

SYNTHETIC AND FIBROUS CASINGS

There are literally billions of pounds of sausage made each year in the United States alone. There just isn't enough livestock in the entire world from which we can derive enough casings with which to make all these luncheon meats and sausages.

So as you can see, the synthetic casings are actually a blessing. The fact of the matter is that we practically never see any natural casing on sausage or luncheon meats any more. I would estimate that 80% of all the sausage sold at your favorite market today is stuffed into collagen casings, and all the luncheon meat and bologna are stuffed into synthetic casings.

Probably the most popular casings used today are the plastic casings. They even come in an array of colors: usually red for bologna, white for liverwurst and clear-colored for custom smoking (i.e. deer salami, cooked salami, etc.).

There are synthetic casings on the market today that can be used for hard salami, semi-dry sausage, and thuringers. These casings usually are lined on the inside with a coat of protein, which causes the synthetic casing to shrink along with the meat as it is drying out. As with collagen casings, the synthetic casings are uniform and a boom to the sausage industry when it comes to portion control. In addition, when you start to compare the prices of beef bungs or middles against the synthetic casings, it is hard to say no to the use of synthetic casings. The synthetic casing is easier to store, need not be refrigerated and does not have to be cleaned.

Fibrous casings generally are used in making dry and semi-dry sausages. As mentioned earlier, when the insides are coated with protein, this casing has the ability to shrink with the meat when being dried. The fibrous casings have the fibers running through them lengthwise which gives them added strength. You can stuff a salami or sausage much tighter without breaking the casing, thus eliminating most of the air pockets. Truly, without collagen or synthetic casings, you would not see the delicatessen counters as they are known today. There would be a limited supply of sausage, lun-

cheon meats or hot dogs. There is a definite use for the collagen and synthetic casing.

Most manufacturers have synthetic casings available that are already pin-pricked. A sausage, luncheon meat or salami will smoke just as brown in a synthetic casing as it will in a natural casing. The synthetic casings are porous enough to absorb the smoke. When buying synthetic casings, always make it a point to find out how long they should be soaked in water, as the various manufacturers specify different time periods.

Some sausage makers soak fibrous casings in vinegar or liquid smoke before stuffing. This has a two-fold purpose: The first is to prevent surface mold; the other is to prevent the casing from sticking to the meat after it is smoked (coagulation). I am sure that at one time or another you have tried to peel the casing off a piece of sliced meat. To your dismay, part of the meat peeled off along with the casing. This can be frustrating.

If you do make a salami or some other luncheon meat and encounter this problem, there is a way around it. Before slicing, soak the whole chunk of salami in water for several minutes. The water will soak through and separate the casing from the meat. You can then slice the salami and peel off the casing as in the usual manner.



A casing perforator is used to pierce air pockets in large or small sausages.



Fibrous casings before customizing. These casings are available in any length and can be purchased with one end tied.



Synthetic fibrous casings must be soaked in water before using. Soaking allows the casing to become flexible and easier to work with. A dry casing can break during stuffing as it is sometimes brittle; a soaked casing will give to some degree. The manufacturers of these casings will specify the time periods required for soaking.

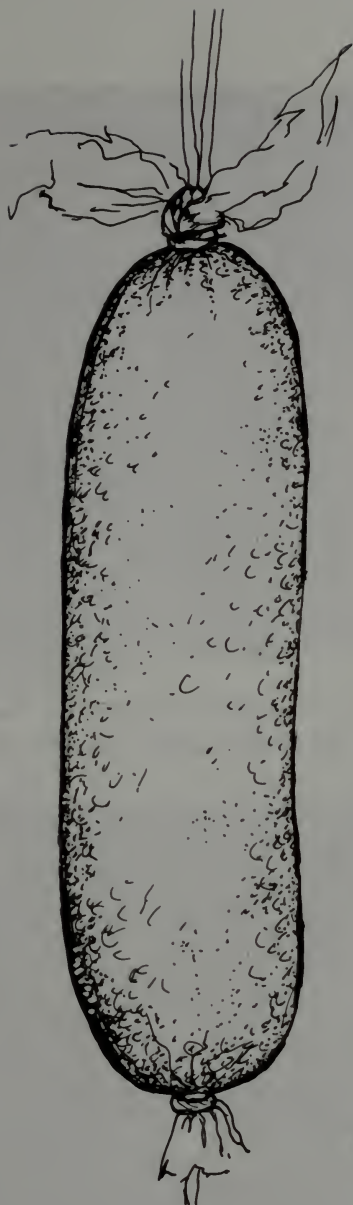


The large synthetic casings are stuffed a section at a time. Note the hand holds the casing firmly while wrapped around the nozzle of the stuffer with great pressure being applied. The meat is packed very hard into the casing to eliminate air pockets.



After the casing is stuffed, it is a good idea to grab hold of the untied end with one hand and the entire salami with the other hand. The untied end is held firm while the salami is being twisted to a point that it becomes firmer still.

RIGHT WAY



WRONG WAY

When making the large type bologna or salamis it is imperative that great care is taken in the tying of the twine properly. Take note that the top of the salami is spread out like a butterfly and the twine is tied in a criss-cross manner. This is the proper way to tie these sausages and both ends should be tied in this manner. If the sausage has a knot as shown in the bottom part of this drawing, the meat as it warms, will cause the knot to slip off causing loss of the meat.



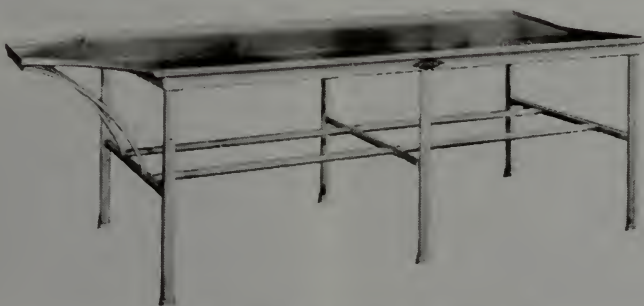
After twisting the salami, it usually requires two people to finish this operation; one to hold the salami while it is firm, and the other person to tie it.



Unless a machine is used to tie each end of a salami, not enough can be said about this particular operation. Both ends must be tied in the manner shown or the meat will slip out of the casings during the smoking and cooking periods. There is no other way to tie a salami.



Even though a casing may be packed firmly and tied properly, there always seems to be a few air pockets to be punctured. It's a good idea to puncture as many of these air pockets as possible to avoid the fat from forming in these pockets during smoking and cooking.



SAUSAGE STUFFING TABLE

Available in lengths of 6' to 12' and up to 4' in width. Note that the top of the table has a turned up rim and beveled to the center. This prevents the sausage from sliding off the table and excess water to drain off into one end of the operation.

Below are a couple of manual hog ring pliers. If you've ever made any appreciable amount of salami, tying the ends with string, you'll appreciate the value of these pliers. I've had my hands bleed more than once when using string to tie salami.

MANUAL-LOAD
Hog Ring Pliers



These pliers are a fine tool to use for closing both ends of a salami. It requires one person to hold the salami and the other to load the pliers and clip each end shut.



Hog rings come in different sizes.

Spring-Loaded
Hog Ring Pliers



The above pliers are a better quality since they are a spring-loaded, factory-built tool. The hog ring is held in place by the spring and doesn't fall out. The salami casing is twisted shut, pliers picked up and the end is closed, making this a one-person operation.



Clark clips come in one size and can be made to fit any casing up to 8 inches in diameter.

Salami closed with hog ring.



Salami closed with clark clip.



The clark clips are only used to seal the bottoms of the casings. The tops are usually tied with butcher twine or hog rings. You can seal all casings from beef stick to bologna.



First, casing is folded and trimmed to fit into clip. Place casing into clip and squeeze tightly with pliers.



Single Clip Machine

This machine is designed to close salamis and bolognas. It can be used with natural or artificial casings. It is especially useful in smaller and medium-size plants as they don't require compressed air for operation.

CUTLERY

PROPER USE OF SHARPENING STONE & CARE OF CUTLERY

In sausage making there are no other tools as indispensable as cutlery, especially when it comes to making sausages at home. In fact a good sharp knife is used in your kitchen probably every single day of the year and yet we hardly understand the dullness or sharpness of a knife and what causes it. Over my lifetime I have used every imaginable type of sharpening stone to electric belt sanders designed to sharpen knives. The trouble I think that is most of these mechanical devices have been designed by the people who sell knives to wear them out so they can sell us more knives. As far as I'm concerned you should be able to own a set of knives for a lifetime without wearing them out, even if you use them everyday.

Fortunately for us, we are in an age where technology has altered the shapes, sizes and designs of these sharpening stones to help us keep a set of knives for a lifetime. I have found that industrial diamonds and carbide are two of the best materials to help keep cutlery sharp with a minimal amount of wear. These are the only two materials I know of that can sharpen stainless steel cutlery with great ease when done manually.

To begin with, just sharpening a knife is not enough. After it's sharpened it has to be honed. Why? When a knife is sharpened and you put an edge on it, it still has a lot of roughness left on the edge and using it that way will rip the meat rather than cut it and cause it to quickly become dull. This roughness has to be honed off with a very fine stone or sharpening steel so as to cut meat not rip it. Yes the fact is cutting meat with a knife for an extended period of time will make it dull, much the same as cutting wood, paper, or anything else.

CHAPTER V

**Selecting and
Storing Meat**

SELECTING MEAT AND STORAGE

The biggest secret to making a good sausage is the use of good grades of meat. It stands to reason that if you purchased a roast in the supermarket you would pick out the best you could find. A roast full of fat and gristle would not be very desirable; it would not be tasty and would cook away. It is foolish to make sausage with lots of leftover trimmings that contain mostly fat. This indeed makes bad sausage. Sausage made with excessive fat and gristle will taste bad and cook away. A small amount of fat is desirable in a good roast as well as in good sausage. This helps to make it tender and juicy; no fat, will make the meat dry.

Pork butts are usually used in making sausage and they generally are very good grades of meat and are recommended for making good sausage. The ratio of fat and meat called for in these recipes generally runs about 25% fat and 75% meat. Once in a while, a pork butt will have an excess amount of fat which can be trimmed off and thrown away. (See color pages) If you have the butcher grind your meat for you, always have him trim out the gristle, sinew, blood clots and excess fat.

It is desirable to purchase the meat the same day you are going to make the sausage. If this isn't possible, try not to store the meat in your refrigerator for more than a couple of days. If it is already ground, the meat will start turning a black or dark grey color. Pork against pork, or pork against any other meat, will start to turn black. This isn't appealing to the eye, even though the meat isn't spoiled.

A regular meat cooler used by your butcher holds temperatures at around 32° F. Your home refrigerator is usually kept around 40° F because of the vegetables and various items that would freeze at 32° F. Do not store the meat too long before use.

When you make sausage, either fresh or smoked, always treat it as fresh meat. It is a good idea to set aside the amount of sausage that you will use in the next couple of days and freeze the rest.

Freezing helps to retard spoilage and seals in the flavor of the spices. It is highly recommended not to make any more

sausage than you can use in a period of 4-6 weeks. After this period of time it has been found that the sausage will lose all its flavor. A sausage made using garlic as one of the ingredients will lose its flavor in a period of 6 weeks while stored in the freezer.

I have mentioned that freezing retards spoilage. You can actually spoil a product in your home freezer if it is kept there long enough. Your home freezer is usually kept about 0° F where a commercial freezer is kept at around minus 25° F or colder. At this temperature you can stop spoilage in a commercial freezer. As you can see, there are some important differences in comparing our home freezers and refrigerators against the ones used in commercial operations.

An important note should be made here about smoked sausage as well as smoked meat. Because meat or sausage is smoked, many people tend to think that this meat should last a lot longer. This is not true. The amount of extra time a smoked product will last is not even worth mentioning.

There is little difference between smoked products and fresh meat products. Both should be treated as fresh meat. As you read the formulas for smoked sausage and meats, you will find that there are no great amounts of time involved in smoking a sausage. You might be surprised at the short amount of time that is required to smoke a sausage.



A plastic cutting board. Hardwood boards or tables are no longer acceptable for cutting meats as they help to breed bacteria. Plastic boards can be easily washed in a sink. Knife marks are scraped off with a dough scraper.

REFRIGERATION (ICE & ICE WATER)

Since this book generally has been written to supply information for sausage making and curing meats in the home, I feel that more detailed information should be given in reference to refrigeration, ice and ice water.

From the time an animal is slaughtered, you can assume that mother nature starts to take over; that is, the meat will start to deteriorate. By the use of refrigeration, ice or ice water, we can slow down this process until the meat is processed or used up. For the most part, it is best to store the meats at between 34-38° F, prior to processing. Just about all the formulas in this book specify that the temperature of the meat should be between 34-38° F during processing.

The ideal place to process meat or sausage is in a regular walk-in cooler since everything is cool and under refrigeration. Most of us, however, do not own our own coolers, so the next best thing to do is to keep everything cool.



Knee operated lavatory



Foot pedal operated lavatory

SANITATION

The whole process of making sausage and curing meats depends a great deal on sanitation. Bacteria and molds are the result of poor sanitation habits that literally destroy cured meat. These microorganisms are all around us and cannot be destroyed completely. Very good sanitation habits can prevent the growth and spread of bacteria.

A healthy butchered animal is generally sterile and fairly free of bacteria. It is at that time of processing, when the meat is exposed, that problems can begin. It is imperative that meat either be processed or placed under refrigeration as soon as possible.

Processing a recently-killed animal is especially important and critical when making dry-cured salami. It is only the bacteriological microorganisms of the animal itself that are required to give this type of salami the proper flavor or tang. Other unwanted organisms eliminate the consistent flavor of these types of sausages. Fresh meat is ideal for unwanted bacteriological growth that can cause rapid spoilage. Even though the butchered animal is virtually free of bacteria, unwanted organisms can be transferred from the hide of the animal, the surfaces the meat comes in contact with, and even the hands and tools of the workers themselves.

Hair nets or hats should always be worn to reduce the chance of these problems. This would include covering a beard as well. One simple hair contains millions of unwanted bacteriological organisms. If you ever see green spots the size of quarters or half dollars in cured meat, someone did not properly wash their hands after leaving a washroom. It is that simple to contaminate meat. Not enough can be said about a good sanitation program.

Sanitation always should be kept at the highest possible level when making sausage. Always wash your equipment before using it. In using hot water to wash the equipment, be sure you let the equipment cool off before you start making sausage. Equipment not properly cooled will raise the temperature of the meat, and also make the sausage look greasy, no matter how lean a meat you are using. This is called

smearing.

It is desirable to make sausage in the cooler hours of the day, either early morning or late evening. Avoid the heat of the day unless you are making sausage under refrigerated conditions. Try not to make sausage in temperatures above 70° F. Always line up in advance all the spices, equipment, casing and whatever other items that will be needed to make sausage. Bring the meat out last, grind it, mix it, stuff it and then put it back in the refrigerator (unless you are going to smoke it).

Ice generally is used in the large sausage kitchen to keep the meat cool when chopping it in the large meat choppers. The RPM's of the cutting blades are so great that the meat temperatures start to rise and ice has to be introduced into the meat chopper to maintain 36-40° F temperatures.

It takes about 3-4 minutes to mix the spices and chop 200 pounds of meat to the consistency of breakfast sausage. When you are using a hand meat grinder or a small electric grinder, you are generating heat as well. Since ice will not grind very well, simply make ice water using the ice itself to keep the temperatures of the meat at 34-38° F or whatever the formula calls for. After the meats are ground and mixed, it is best to keep them in the cooler until they are actually ready to use.

Maintaining the specific temperatures of 34-38° F also is very important when it comes to curing meats. When you allow the temperature to fall below 34° F, the curing process itself stops. It is absolutely essential that the temperature is maintained above 34° F. On the other hand, the temperature should not exceed 38-40° F. This will cause the meat to start spoiling before it can be cured. It is just as important to maintain the temperature above 34° F as it is to keep it below 38-40° F. If you maintain the temperature and follow the instructions as outlined in the formulas, you should never spoil any meat.

A separate refrigerator is usually needed if you are going to cure meat at home. The temperature required to prevent meat from spoiling is lower than the temperature needed to keep vegetables and fruit.

STUFFING SAUSAGE

After the meat is ground, the next step usually is the addition of the remaining ingredients that are to be mixed thoroughly with the meat. It is after this that some problems can be created unnecessarily.

Beginning with fresh sausage, it is inevitably stuffed into a casing after mixing. I don't know a single sausage maker who would make it any other way. The meat is ground, mixed, stuffed and placed in the cooler, all in quick order. Or it can be frozen if not intended for immediate use. However, when we get to smoked or cooked sausage, a good number of people have the idea that it is best to season the meat overnight. This procedure usually has been passed on from generation to generation with many family recipes.

Allowing the meat to season overnight causes the meat to set up and absorb all the liquid that you added to the mixture. The meat really does absorb the water, and then sets up like a slab of cement. Needless to say, it becomes exceedingly difficult to remove from the container, and equally difficult to pack into a sausage stuffer. The salt that is mixed with the meat is used as a binding agent in addition to flavoring the meat. However, besides the salt and spices, the non-fat dry milk or soy protein concentrate will cause the meat to set up even more.

The longer you take to stuff the meat into a casing, the more problems you'll experience. It is best to get it into a casing right away.

When I first opened "The Hickory Shop" in Las Vegas, I, too, seasoned the meat overnight before stuffing. As our business grew we made more sausage and wound up mixing meat and stuffing sausage all day long. We could no longer allow the meat to season in the mixing tubs overnight because we just didn't have the room. We soon found that it made little difference whether the meat seasoned in the casing or a plastic tub; there was no difference in flavor. We were pleasantly surprised. We figured that the key to the whole thing was the mixing of all the spices and ingredients properly. Stuffing the

sausage was most definitely faster and easier. It was far easier to stuff pliable, freshly-mixed meat into a casing than chunks of meat that had been allowed to set up over night.

Another benefit is that the whole process was over within one day. If there was ever any one part I disliked about sausage making, it's clean- up time. On top of this, we made better use of our smoker by using it every second day, rather than every day. We completely utilized its 300 lbs. capacity rather than smoking 100-150 lbs. a day.

When the Hickory Shop first opened, the meat was mixed by hand. We would add the ingredients and water as well. We really never measured the water, because we were more interested in mixing the meat to the right consistency. After mixing we took a handful of meat and made a fist. When the meat would squirt out between my fingers, it was at the right consistency for stuffing. It was no problem to stuff 100 lbs. of sausage in 10-15 minutes.

It was never this easy when the meat was allowed to season overnight as it came out of the containers in chunks. Then we had to be sure and pack it really well into the stuffer to eliminate all the air pockets. The little extra water we added to the meat had no bearing on the good-quality sausage we always produced. It simply doesn't take much water to get the proper consistency of meat, especially a fresh sausage as opposed to a product you will smoke and cook.

Another important factor we discovered was that the temperature of the meat rose substantially during the sausage-making process. When you grind meat, the grinder itself produces heat. The ingredients we added were usually stored at room temperature, with the exception of the ice water (ice water was used to try and keep the temperature down).



Air bubbles may also be eliminated with a sausage pricker.



As a point of interest this photograph was made of a piston (plunger) with meat around it. This is a picture of a plunger after stuffing sausage and is a common occurrence in the largest sausage kitchens with the most expensive sausage stuffers. Some seepage must be allowed in order to keep back pressure from building up. Great emphasis is placed on packing meat into a sausage stuffer, but there are always air pockets that cannot be completely removed, which cause back pressure to build up.

Don't be afraid to prick out the air pockets, because they will seal themselves and help keep the juices in the sausages during the cooking or smoking processes. The pin-pricking applies to all casings, natural or synthetic; the size of the sausage or salami makes no difference.



When linking a sausage, this type link must have at least 3 knots tied in it.

The sausage stuffer to the right is a one-speed stuffer. The piston goes up and down at the same speed. It is designed for home use or for a sausage kitchen making 500-600 lbs. of sausage per week. Manufactured by The Sausage Maker, Inc.



The 25 lb. stuffer is manufactured by The Sausage Maker. It is a two speed, geared sausage stuffer ideal for a sausage kitchen producing around 1500 pounds of sausage per week. The stuffer is geared for the piston (or sausage press) to come down slowly during stuffing. When it has to be refilled, the handle is changed to another gear and the piston comes up quickly.



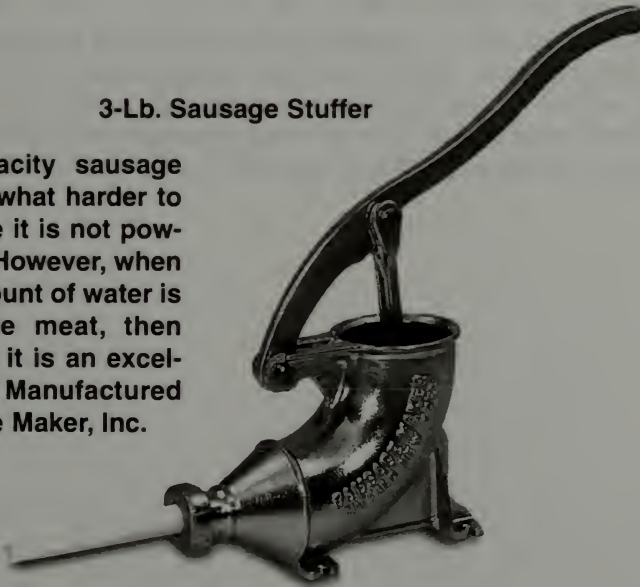
5-Lb. Sausage Stuffer

This 5-lb. capacity sausage stuffer is the smallest one made using gears to do the work. It is ideal for home use. Manufactured by The Sausage Maker, Inc.



3-Lb. Sausage Stuffer

This 3-lb. capacity sausage stuffer is somewhat harder to work with since it is not powered by gears. However, when the correct amount of water is mixed with the meat, then stuffed quickly, it is an excellent machine. Manufactured by The Sausage Maker, Inc.





Sausage Stuffer Attachment for Meat Grinder

The above meat grinder and stuffing horn were intended to save money by omitting the purchase of a sausage stuffer. However, this type of apparatus has many drawbacks. The meat must first be ground and spices mixed with it. After this, the meat has to be stuffed through the grinder again to get it into a casing. So, the meat is ground twice. Additionally, you can't properly stuff a large-diameter salami or summer sausage casing. Lastly, it is a very slow process and should only be used if you are going to make just a few pounds of sausage. Recommended only if you have a lot of time.



Pork Butts

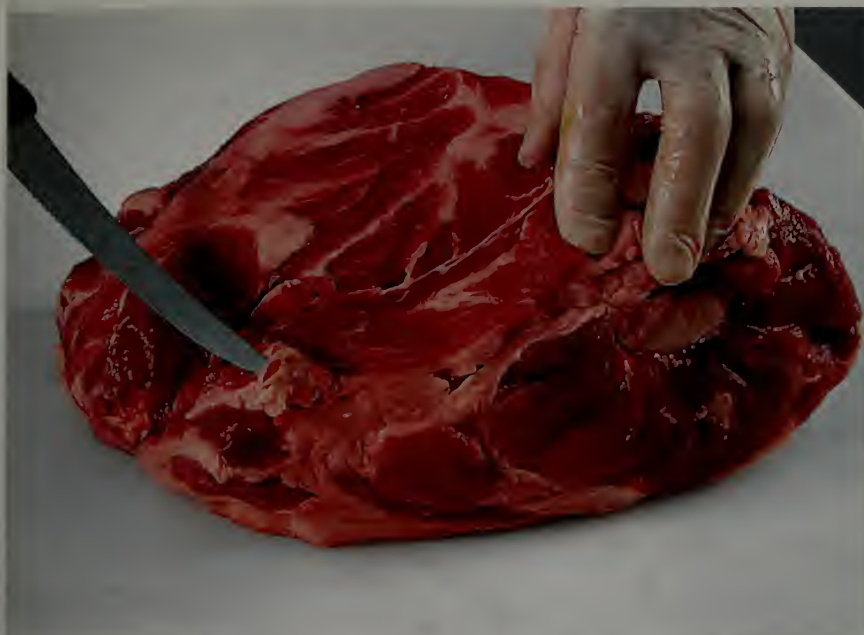
The pork butt is the most widely-used meat in making sausage. For the most part, a regular pork butt is the type most generally available in the local super market. There is such a thing as fancy pork, but it is only available in markets that specialize in meat.



Regular Pork Butt



Fancy Pork Butt



When boning a pork butt, try to be on the lookout for the gland, as shown above at the end of the boning knife. These glands are bitter, and should be removed when possible.



The meat is first boned off the top point of the pork butt.



The knife is then placed on the pork butt just behind the bone on top.



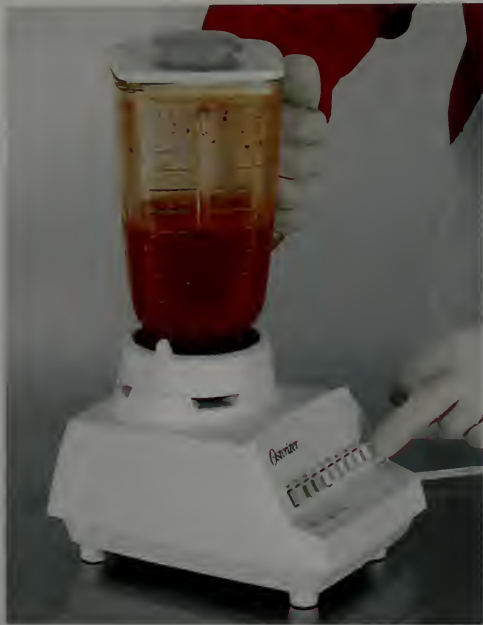
Meat is removed off the entire blade bone.



A completely boned pork butt.



When making sausage, all spices should be premixed before starting. Above shows 4 bags of premixed spices to be mixed with 25 pounds of meat per bag. Bags contain all spices, soy protein concentrate and cure.



A bag of premixed spices can be placed into a container and mixed with water very well. This is preferred and will give you better distribution rather than trying to mix the spices dry with the meat.



Premixed spices simply poured over the top of the meat in a mixing tub.



25 pounds of meat in a 50 pound mixing tub. Note the adequate room in tub to prevent meat from falling out on the floor or table while mixing.



Placing meat into a sausage stuffer.



Meat should be well packed into the stuffer using the fist to pack it down. This helps to eliminate air pockets and stop back pressure from building up.



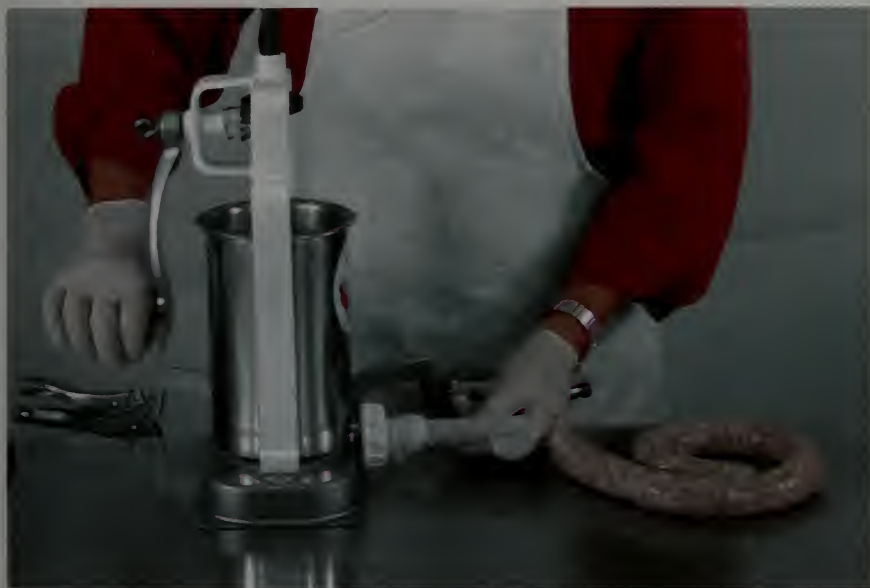
A generous amount of water should be introduced into the casing before placing it on the stuffer nozzle.



Before putting casings on the nozzle be sure you slop plenty of water all over the nozzle. This lubricates the nozzle and will allow the casing to go on easier.



Putting a casing over the nozzle.



When using a long casing for stuffing, air pockets tend to form in the casing on the nozzle before you are half through or sooner. A lack of water will cause this.



To eliminate the air pockets in the casing, hold the nozzle on the bottom and tap the air bubble with a pricker. A needle can also be used to puncture the air bubble.



Note that the casings are at the back end of the nozzle after stuffing an amount of sausage. During the course of stuffing sausage, always try to keep the casing to the front of the nozzle where the meat comes out. This will eliminate air pockets and breakage of the casings.



Note the proper positioning of the casing on the nozzle. It should be noted that the casings will come off easier when being stuffed with meat.



When linking sausage, it is best to have all the meat stuffed into the casings.



To make a consistent size of link sausage, it is a good idea to make marks on your table for the actual size you require. In the above photo the blade of the boning knife is used to measure each link.



The sausage in the above photograph is linked about 4 to the pound.



Sausage links picked up and placed over the arm, the proper way to pick up sausage.



The proper way to place sausage on a smokestick. Note the stick is being placed to the side and under the arm.



When removing the sausage from the arm to the stick, it is advisable to let one end of the stick rest on a table or counter top. There are few people who can remove the sausage and hold a full smokestick of sausage with one hand. One end of the stick in the above photograph is resting on a counter top.



After being placed on a smokestick, the sausage should be properly spaced for smoking. Pieces of sausage touching each other will not acquire the smokey color at the points of contact.



When placing linked sausage on a smokestick, the sausage on each end may be twisted in the above manner to prevent unwinding of the links.



When making round links the sausage is cut in longer pieces when coming off the nozzle. Be sure you have a few inches of casing on each end for easy tying. Needless to say, a bundle of casings will not go as far when making round links as a good deal of the casing is used for tying knots.





Electric Grinder

Using an electric grinder for stuffing sausage is done by many people. It is recommended that this be done with two people. One person stuffs the meat into the grinder and the second person controls the flow of meat into the casing, creating a firmer sausage.



Notice in the above photo on the grinder is a bell shaped stainless steel stuffing tube and of course not shown, but on the inside of the head, is a spacer for easier flow of the meat into the stuffing tube.



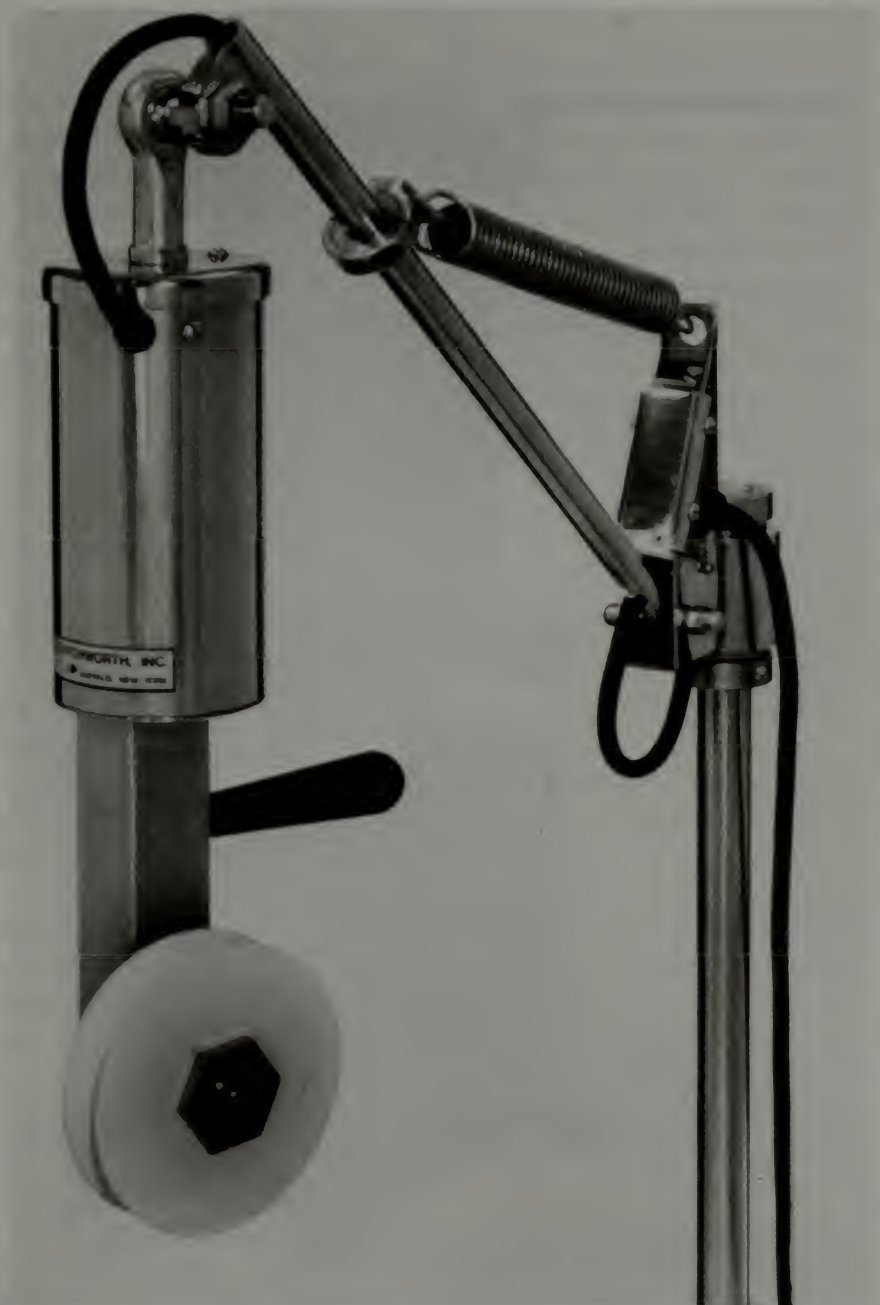
The Water-Powered Sausage Stuffer

A water-powered sausage stuffer, has a 100-lb. capacity and is portable. It is ideal for a small sausage kitchen.



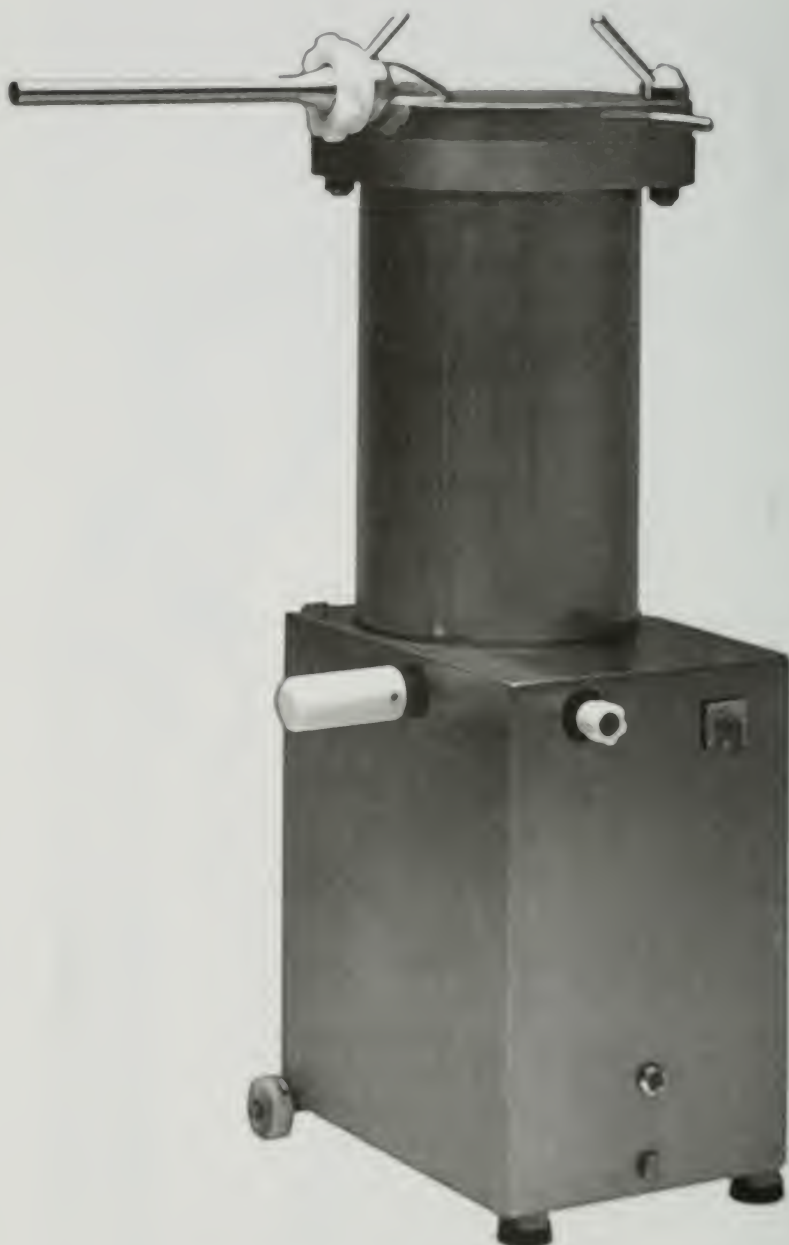
200-Lb. Capacity Electric Sausage Stuffer

The above is an all-stainless steel sausage stuffer that is controlled by electric push buttons or a foot switch for a hands-free operation.



Automatic Casing Applier

The above applies natural casings in half the time it takes to do it by hand.



50-Lb. Hydraulic Sausage Stuffer

This small unit is completely mobile and of all stainless steel construction. Manufactured by the Koch Equipment Co.

GRINDING MEAT

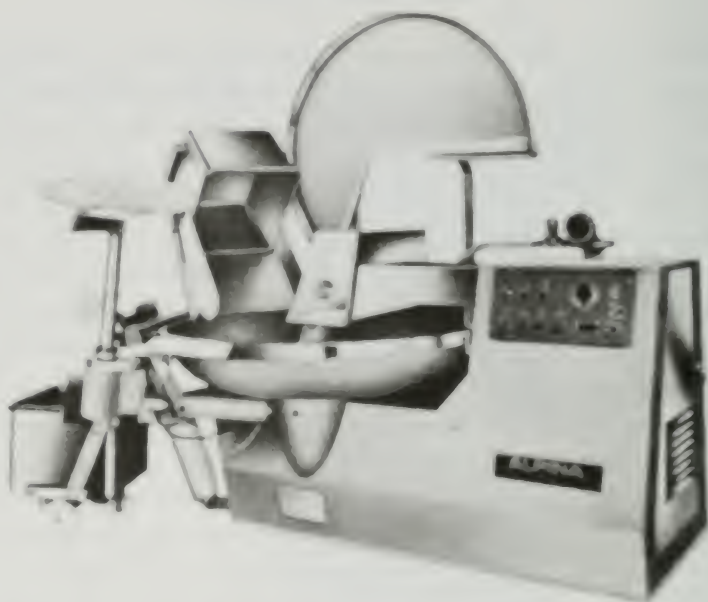
In this book the various formulas for making sausage give the sizes of the chunks of meat that are to be cut up or ground. The size of the meat chunks usually is determined by the ethnic group that a particular sausage represents. For the most part, the recipes are formulated so that they can be made at home using a coarse grind of meat. There are no set rules for the size that meat should be ground to; some people like a fine grind and many people prefer the coarse grind. Some people prefer fat in their sausage and a lot of formulas call for it. Other people do not, but still prefer the coarse grind.

It generally is a good idea to keep all lean meat separate from fat meat. You can grind the fat meat very fine and the lean meat coarse. This will give you a lean-looking sausage as the smaller particles of fat will not appear on the surface of the casing, but the sausage will still contain the amount of fat needed to make a good sausage. It is strictly up to individual preference as to the size of meat one wishes to grind, as well as the size of grinding plates one may have on hand at the time.

When making a dry-cured or cooked salami, the grinding of the meat is very important. Without the proper handling of the meat, you cannot get the finished product you desire.

A number of sausages and luncheon meats have a special appearance that we are used to seeing. The mortadella sausage, or luncheon meat, if you wish, would look exactly like bologna if it weren't for the cubes of fat that are mixed with the meat. The same is true for Chinese sausage. It also calls for cubes of fat as part of the formula which gives it a special appearance. Probably more familiar to most people is the cooked or dry-cured salami that shows the distinctive white specks mixed in with the meats.

Special care is required to acquire these distinctive looks in these special products. It is positively not just a case of grinding the meat. The fat products used to give these sausages that special appearance must be very cold and even slightly frozen before they are ground up. The fat usually is ground last and mixed in only after the lean meat and



A large meat chopper. This machine can chop 200 pounds of meat to the consistency of a milk shake in about 5 minutes.



An enlarged picture of the cutting blades used in the above meat chopper. These blades are honed once or twice a week and are kept in razor sharp condition.

spices already have been mixed. Care should be taken not to mix the meat too long. The longer the meat is mixed, the more heat we generate, and the fat specks start to break down and smearing takes place.

To mix 100 lbs. of meat in a mechanical mixer along with the fat, a period of one or two minutes is adequate. It doesn't take any longer mixing by hand, providing you're not trying to mix 50 or 100 lbs. You are far better off to mix 25 lbs. of meat in a container built to hold 50 lbs. You'll have more room to work and do a much better job.

Mixing the meat by hand also raises the temperature. Then, of course, there is stuffing the meat into a casing, hanging it on a smokestick and simply allowing it to hang at room temperature until it is completely dry. By the time you finish the last stuffer full of meat, the first batch of sausage is already almost dry.

Keep in mind the meat that originally came out of a 38-40° F cooler and is almost at room temperature by the time you've finished.

Does it really make any sense at all to place it back in the cooler and lower the temperature back to 38-40° F, then take it out the next day and hold it at room temperature until it's dried properly, allowing the temperature to again rise to 65-70° F? Not really.

You're better off allowing the sausage to dry completely at room temperature in the first place, then placing it in the smoker.

Practically all the recipes in Great Sausage Recipes and Meat Curing tell you to dry the sausage at room temperature before placing it into a preheated smoker. The smoker is preheated so the drying process can be completed at relatively low temperatures usually in the 120-130° F range.

Only the semi-dry cured or dry-cured sausages are packed into containers since they have to ferment. Needless to say, a pretty good sausage stuffer is required with some sort of crank and press. Air pockets must be removed and more pressure can be applied when stuffing the casings.



Double-Action Mixer

The above is a double-action mixer with auto timer, to prevent over mix, this allows a smaller heat buildup in the product being mixed. This machine is capable of blending 150-lbs. of meat with the seasoning in just a few minutes. It is ideal for small sausage kitchens. Manufactured by Leland Co.

FROZEN MEAT

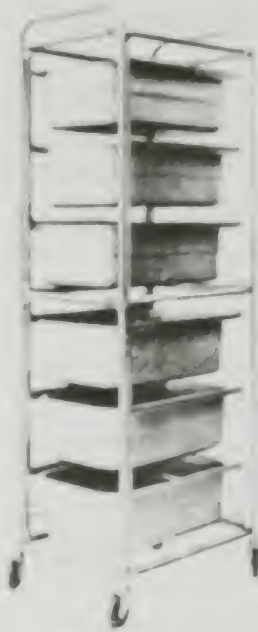
Over the years a lot of inquiries have been addressed to me concerning the use of fresh frozen meat in sausage making. In regard to sausage making, freezing meat has little or no effect on the end product. Freezing is a good way to store meat that is purchased at a good price. It is also handy if you've over-purchased. The meat can be thawed and used when needed. This also includes any kind of game meat.

It is worthy to note that I have thawed meat a number of times only to have found out that I thawed too much. I simply placed it back in the freezer and used it at a later date. I found that I could thaw and re-freeze fresh meat up to three times with no ill effect when making sausage.

It should be pointed out, however, that a residue of blood was left in the container that the meat was thawed in. This is a common occurrence when thawing meat and the liquid that comes out of the meat during this period is actually the flavor of the meat that is being lost. It is best to put this liquid back into the meat and mix it if you are going to make sausage. Obviously, if the meat is not going to be used and is re-frozen, some flavor will be lost.

It is desirable to thaw meat at around 35 degrees F. The liquid lost during thawing will be kept to a minimum. If you thaw at room temperature you will find an excessive amount of liquid being leached from the meat.

In regard to smoked sausage or a cured and smoked piece of meat, it is not a good idea to thaw and re-freeze these products. These types of products can only be frozen once after they're made. Thawing and re-freezing can cause the meat to become mushy. It is best to thaw fresh meat and make a sausage and then use it up rather than making a larger amount and freezing it.



A meat cart loaded with meat boxes. Can be used to store meats or for the curing of sausage meats before stuffing.



All-metal meat storage truck. This truck has a capacity of over 1200 pounds.

MEAT COMBINATIONS

As with the grinding of meat and its size, there also are no set rules as to the type of meat that a person should use in making sausage; that includes the fresh, smoked, dry or semi-dry types. Any combination of meat can be used to make these various sausages. People who have an excess of lamb, rabbit, wild game meat and whatever else there is in the line of meat may use it in making sausage.

Today, a great deal of poultry meat is being used in making the very fine- texture sausages, better known as hot dogs or wieners. Probably the more important thing to remember is the meat and fat ratio required to make these various sausages. In most cases, no matter what type meat is being used, the spices or seasonings that are used give a particular sausage its identity. Most luncheon meat and sausage is made of pork; the seasonings and spices are what make them so different from one another.

CHAPTER VI

Ingredients Permissible in Meat Processing

WHOLE SPICES

Whole spices are used in a number of sausages and smoked meat. Besides providing desirable flavors, they also add to the appearance of the product. Coarse pepper is used in a pepper loaf or with beef; whole pepper in various salamis; bay leaves in pickled pig's feet, and pickling spices in corned beef.

GROUND SPICES

Fine ground spices are nearly impossible to purchase in a supermarket or a local restaurant supply house. Generally, these fine ground spices are used by sausage makers and are available only from the manufacturers who provide this trade with various products as well as spices.

Fine ground spices have the ability to blend in with the meat so completely they cannot be seen. A case in point is the wiener. The formula calls for approximately nine different spices. The fine ground spices give off more flavor more readily, because grinding breaks down some of the flavor cells of the whole spice releasing the flavor.

GARLIC

From time to time I've had people ask me about the use of fresh garlic cloves versus granulated garlic. There is absolutely no question in my mind: fresh garlic is better. There are several things to consider, however, and the decision is solely up to you.

Commercially, granulated garlic is more desirable, for obvious reasons - you don't have to peel it. For home use, you can simply weigh what you need, place it in an electric blender with a little water, and liquefy it. There is practically no trace of the peelings using this process. The aroma of fresh garlic and hickory smoke is unbeatable.

After letting the sausage cool overnight, the liquid of the meat activates the garlic and it is virtually impossible to tell if fresh garlic or dried granulated garlic has been used after cooking. Both are equally good. The only difference between

the two is that granulated garlic gives off very little aroma, but the flavor is there.

On the plus side for granulated garlic is the fact that it is always dry and much easier to use. It also stores well, providing it is kept in a container free from air, light and humidity. If these three conditions are not met, the garlic will deteriorate, as it is the most volatile of all spices.

Fresh garlic, which is so good, simply doesn't keep well for any period of time. It dries out and loses its aroma. Regarding its use in a sausage formula, the same weight is always used, either fresh or granulated; I find it to be equal in flavor. If a recipe calls for 1 ounce of garlic, you can use either fresh or granulated. Should you want to make a garlic sausage additional garlic can be added to either the fresh or smoked Polish sausage recipes found in this book. The amount of garlic used in these recipes can be adjusted to your personal taste.

DEHYDRATED CHOPPED ONIONS

The same situation exists with dehydrated onions as with garlic. The considerations are the same for commercial or home use. Dehydrated onions are clean and ready to use; simply add a little water to the dehydrated onion and allow it to reconstitute. The dehydrated chopped onions are best for sausage making as they are always in uniform pieces, easy to store and easy to use.

SALT

Salt is one of the most important products in the making of a good sausage as well as in curing meat. Salt has to be considered a spice because it enhances the flavor of meat. It also serves as a preservative and comes in flake, rock or granulated forms.

In order to be sure that you are using a high grade of salt, dissolve one or two tablespoons in a glass of water. You have a good grade of salt if the water is clear. If the water is cloudy, you have a low grade of salt that probably contains various heavy metals. Do not use iodized salt for making sausage or curing meats. Canning salt, kosher flake or purified salt is best in making sausage or curing meats since they dissolve more completely.

Purified salt is used by commercial sausage kitchens as a safeguard to be sure they are using a good grade of salt.

It is extremely important that the salt levels, along with the cure, in semi-dry or dry-cured formulas are never changed. These recipes are formulated to give the meat a special flavor and more important, to help destroy trichinosis if it is present in the pork. During the dry cure process, the salt also discourages the growth of unwanted organisms that could alter the tang or flavor of the sausage.

Salt also acts as a binding agent when making dry-cured meat or sausage. For this reason alone it'll probably be a long time before we will be able to see low-salt sausages that are dry cured. Cooked and smoked sausages can be made with less salt because there are a number of products added to it to help bind it after it's processed. These products include corn syrup solids, non-fat dry milk, soy protein concentrate and dextrose. These ingredients combine during the cooking cycle and become one big binding agent which allows the use of less salt.

You must remember, that salt is a necessary ingredient in sausage making, especially for dry cure and semi dry curing. Should you desire a less salty sausage on any of the cooked-smoked recipes in the Sausagemaker recipe book, use approximately one third less salt for a less salty flavor. Should

you have health problems and are not allowed to use salt, fresh sausage can be made without salt, using the other spices required for the sausage that you are making possibly adding another spice that might be to your liking - garlic, pepper, etc.

Salt is also instrumental in modifying some of the protein in processed meat in order to maintain or hold more water. (This does not include dry-cured products.)

As a preservative, it takes extremely high levels of salt, in the 6-8% range, to preserve meat. Normally most sausage is made using 3% or less salt and has to be refrigerated to maintain its freshness. There is little information regarding the extra-preservative qualities salt would give to a product. This is probably due to the fact that salt can vary a great deal from one product to another.

When any kind of meat is mixed with salt and spices, then allowed to season overnight, the end result will be the meat "sets up" or becomes very stiff. This is especially true of dry or semi-dry sausages that have to ferment for a day or so.

It is of extreme importance to note that all the recipes and formulas of this book are based on the usage of granulated salt. This is especially critical in the 10 lb. recipes, since they specify the use of salt in tablespoons. The weight of a tablespoon of granulated salt is greater than a tablespoon of kosher (flaked). The difference between these two salts is great enough to change the end result of the product.

SWEETENERS

Sweeteners have a variety of uses in the making of sausage or the curing and smoking of meat. They are available in a wide variety of forms. Powdered dextrose can be used as a browning agent in the fresh breakfast or country sausage. When fried, this sausage will have a more even brown color to it.

Powdered dextrose is only 70% as sweet as regular sugar, and also is used in processing dry-cured or semi-dry cured sausages. Powdered dextrose is an ideal nutrient for lactic acid organisms that assist fermentation in these sausages and give the desired tang or flavor. Dextrose is much heavier than plain sugar and forces itself into the cells of the meat. Dextrose also is a useful nutrient for the bacteria which reduce nitrate to nitrite when meats are cured.

Sweeteners are used to reduce the harshness of salt and to add flavor. Maple sugar is used in small amounts to produce a bacon with a special flavor and aroma. Caramelized sugar is a sweetener and used primarily to promote browning in cured meats that are smoked or just cooked in a smoke-house.

CORN SYRUP SOLIDS

Corn syrup solids are useful in sausage making, as they have excellent binding qualities when sausage is being cured at lower temperatures. They are important in the semi-dry or dry-cured process as they not only add flavor, but help to support the fermentation process. Corn syrup solids help to hold the color of the meat, which is important commercially. Fluorescent lights in the meat markets tend to bleach out the meat, but corn syrup solids help to hold the cured color for a longer period of time. There also are a number of artificial sweeteners that are used to provide flavor, but without the accompanying browning, as it is not required at times.

SOY PROTEIN CONCENTRATE OR NON-FAT DRY MILK

A major fallacy is that some sausage can contain a lot of cereal. This is not possible. What you have is a very poor-quality sausage and probably contains a lot of by-products and fat. This gives you that mushy taste that people mistake for cereals.

The so-called cereals used in making sausage today generally are either non-fat dry milk or soy protein concentrates. If you take a good hard look at these two most widely-used items in making sausage, you will discover that they are really good as ingredients when it comes to making sausage, besides serving a very useful purpose.

Today, most doctors would rather see people use non-fat dry milk rather than whole milk. As for soy protein concentrate, it is just what the name implies. Plus, on a pound-per-pound basis against meat, it contains up to 250% more protein, and is tasteless. The USDA has regulations which permit the use of only 3 1/2% of either of these products per 100 pounds of sausage.

Have you ever wondered why the hamburger you purchase in a restaurant stays so nice and round and juicy and is almost the same size as it was raw? It's not at all like the hamburger we make at home, which has a tendency to crumble and shrink, with the natural juices remaining in the frying pan. Soy protein concentrates help bind the meat together as well as retain the natural juices of the meat. The job that non-fat dry milk or soy protein concentrates perform in making sausage is very useful indeed. These products are rarely used when making a fresh sausage, because it would give the sausage that bland and greasy look. If this doesn't bother you, it's a good idea to use them. These items are only used in sausage that is going to be smoked and cooked, and the milk or protein has no effect on the appearance of these sausage other than making it look nice and plump.

For example, let's make 100 lbs. of sausage to see what effect soy protein concentrates or non-fat dry milk have. In a 100 lb. formula we would use 100 lbs. of meat, about 2-3 lbs. of salt and spices, about 3 lbs. of soy protein concentrate, 1

lb. casings and 10 lbs. water. After the sausage is made we have a net weight of 117 lbs. of sausage.

We take this 117 lbs. of sausage and smoke it. The sausage is then removed from the smoker, cooled off and weighed, and our end result will be around 105 lbs. What happens here is that during the smoking process the sausage will have shrinkage. The 10 lbs. of water you have used to lubricate the meat for stuffing has left the sausage in this process, but we retained the natural juice of the meat.

If we didn't use non-fat dry milk or soy protein concentrates the end product would be about 85 lbs. of sausage, and it would be quite dry. The soy protein concentrates or non-fat dry milk help to retain the natural juices of the meat as well as bind it together.

If you are going to use a non-fat dry milk for a binder, your local dairy is usually the only place you can buy it. The milk has to be a very fine powder and not the granules used for making milk at home. Better still, it should have the consistency of corn starch.

Some people like to use more non-fat dry milk or soy protein concentrate in their formulas. There are limits to observe. If you use more than 5% soy protein concentrate or more than 12% non-fat dry milk, you will alter the taste of the sausage.

PREMIXED SPICES & CURES

As with the casing industry, the spices and cures of today have become an industry in themselves. This may not seem too important to the average person, especially in regard to the premixed spices that these companies supply. Many people feel they can easily premix their own spices for whatever sausage they may wish to make, and rightly so. The formulas in this book allow you to do this.

On the other hand, the cures that one might need using the formulas in this book are not easily mixed in small quantities and would be more accurately premixed by the manufacturer. The premixed spices and cures have a definite role in making sausage and curing meats. When making larger amounts of sausage, say 500 or 1000 lb. a week, the weighing of the spices can become somewhat of a problem. Not only is this a time-consuming job, but there also is the chance of error by the person weighing the spices, not to mention the large inventories of the various spices that need to be on hand. The 500 or 1000 lbs. of various types of sausage one may produce in any given week is a substantial amount for the small kitchen. On the other hand, a sausage manufacturer making sausage by the tens of thousands of pounds of these same products would have a problem weighing spices.

The manufacturers of premixed seasonings and cures not only have their products to supply, but practically all of them offer you the technological advice that is sometimes needed. These companies can offer you a premixed spice or cure of any kind and the formulation for it. Also, if you have a special formula that you want premixed, they will do that as well and will keep your formula in confidence. You will always have the guarantee from these companies that your private formula will meet all the specifications you require or they will refund your money. This also includes refunding the money that may have been spent on the meat to manufacture the product.

Probably the greatest service that spice companies provide for sausage kitchens and food processors is bacteria-free spices. The average sausage maker, professional or amateur, knows nothing of this and simply never

hears about it. A large sausage kitchen or food processor, producing thousands of pounds of product, is fully aware of how easily bacteria can spoil a product and reduce its shelf life. Bacteria is a fact of life and usually finds its way into a product by itself, so why shorten the shelf life of the product by not using bacteria-free spices or purified salt?

If you've never given spices much thought, think about where they come from. They are supplied to us from all over the world, including countries whose health standards are not nearly as rigid as ours. In fact, some of the countries that supply spices have almost no health standards.

Spices are grown in soil and are not only subject to bacteria but insects as well. These insects cannot always be seen by the human eye. Some spice companies own their own plantations on a world-wide scale in order to regulate the growth and bring you a fine product.

Today premixed seasonings are available in the form of an oil. In fact, when you are buying these premixed seasonings, almost all of them will come to you on a sugar base, mixed with these oils. The plain old spices, however, still are available to you, if you desire.

The curing of meat and making of sausage can become quite an elaborate process today, and most of these companies can supply you with all the equipment needed to process these products, or the information on where to go and buy it. There is no question that, of all the industries surrounding sausage making and meat curing, the suppliers of premixed spices and cures definitely are the most valuable. As with most suppliers for this business, they also require high minimums for you to purchase their products.

PERMISSIBLE INGREDIENTS

Self-service meat counters first appeared during the years of the Second World War, as there was a definite manpower shortage. It was easier to have one person slice and prepack luncheon meats and then place them in a refrigerated counter. Clearly, this was a way of using manpower wisely, rather than to slice various luncheon meats for each customer while sometimes having two or three clerks waiting to use the same slicing machine.

At first, the public rebelled against this new idea of a pre-packaged product, but soon accepted it-especially when the meat counters no longer contained the big slabs of bacon or luncheon meats to be sliced as each customer desired. Problems began to develop, however, as these pre-packaged sliced meats began to lose their attractive cured color after a day or two. It was quickly recognized that the deteriorative effects of air and light would have to be overcome.

ERYTHORBATE AND ASCORBATES

For years, fruit packers have used ascorbic acid and isoascorbic acid as color preservatives. It was felt that these products, which are a part of the vitamin C family, could become very important in achieving more attractive and longer-lasting color in cured and smoked meat.

It was soon found that because the curing solution contained nitrite, both the nitrite and ascorbic acid were uselessly depleted and nothing was accomplished. In further experimentation, it was then found that using only the salts of these acids was an effective way to prolong the color of cured meats. It is important to note that these salts will not deepen the color of the meat beyond its natural color or prevent spoilage by bacteria.

The use of these products is approved by The Meat Inspection Division of the United States Department of Agriculture. It takes a very small amount of these salts to accelerate the development of color during the curing process

and to help immensely in extending the color stability against deterioration from air and light. These products have to be considered in a commercial sausage kitchen. For use at home, however, there is no benefit to be gained by using these salts. Clearly, they are for commercial use only.

In recent years it was hoped that ascorbates might be the substitute for nitrates in curing meats. A great deal of experimentation was completed in England, using ascorbates to cure meats. Unfortunately, it has been found that by themselves, ascorbates clearly cannot do the same job that nitrates perform. It will be very difficult to find a single product that can perform the four or five steps of nitrates. However, it has been found that using these salts in cured bacon reduces nitrosamine formation during frying. The chemical name of isoascorbic acid has become sodium erythorbate, and sodium ascorbate replaces ascorbic acid. These products are manufactured by Charles Pfizer & Co., Inc., New York, New York.

MONOSODIUM GLUTAMATE (MSG)

Monosodium glutamate, better known as MSG, is another product that has come under close scrutiny over the years. A great deal of bad press has been given to this product by people who know very little or nothing about it. As with nitrates, the benefits this product can provide have been conveniently omitted.

Little do the health-food faddists, organic gardeners or consumer groups know that MSG is simply made of beets or molasses made of beets. In fact, practically all the food we eat already contains glutamate.

It can be found in all poultry, fish, milk products, red meat and probably in all vegetables. Our body even manufactures glutamate, much the same as it does nitrite.

Glutamate was used in the Orient for thousands of years and has been produced from wheat and corn. MSG is made starting with plain old natural food substances. A fermentation process is employed and the end result is a substance looking much like salt or sugar. However, MSG is very much different from salt or sugar, which add flavor to food. MSG's role in food is to sort of wake up and enhance the flavor that is already there. I find it difficult to call MSG a chemical. It is clearly a food. For home use, a half-teaspoon per pound of food is adequate. It can be used much the same as salt, before or after cooking.

It should be noted at this time that there are persons that are allergic to the MSG product. These people should avoid its use, as would any person that has allergenic problems with a given food product.

POTASSIUM CHLORIDE

Potassium chloride is a salt with most of the same properties of sodium chloride (common table salt). The big difference between the two is that sodium gives us the salt taste we know so well. Potassium has a bitter flavor. In addition, potassium chloride is at least 20 times as expensive as sodium chloride.

When a mixture of sodium chloride and a smaller amount of potassium chloride is used, along with various other products that help mask the bitterness of potassium chloride, it is possible to reduce the amount of salt in sausage without altering the flavor.

Even at this time, a number of products are being tested to reduce salt as much as 50% in sausage making. There is no question that over a period of time a product will be found to replace the good taste of salt.

WATER

For the most part, water is simply taken for granted. This should not be the case, because it acts as the carrier for various ingredients, such as brines. In an earlier chapter, impure salt was discussed as a carrier of metals which could interfere with the palatability of meat. Pure water will have a pronounced effect on these products as well. In a USDA plant, the water is tested from time to time as part of the USDA program.

PHOSPHATES

Disodium phosphate is another ingredient used commercially to decrease the amount of cooked juices escaping from cured hams, picnics, pork loins, or these very same products when canned. Phosphates have the ability to increase the water-holding capability of muscle protein and that is why they are used. This isn't a product for home use, but is used widely commercially.

To put it in much simpler terms, we often see a cured ham

labeled "water added." Does that mean we are getting a ham full of water? It simply means that the ingredients like cure, erythorbate and phosphates were dissolved in water and then the ham was pumped its usual 10 or 12 percent of its green weight. There is nothing unusual about this, except when they are smoking and cooking, these hams can lose as much as 15% of the green weight.

In other words, 100 lbs. of hams could easily be reduced to 85 lbs. in a smokehouse. This clearly is too much shrinkage and not acceptable. If you were smoking 10,000 lbs. of ham, as some of the commercial meat packers do, you would lose about 1500 lbs. of meat in the smokehouse. There are not too many businesses that can stand that kind of a loss.

Even with the use of phosphates, one should expect to have 5% shrinkage, which is more tolerable. About all "water added" really means is that someone is trying to sell you a smoked ham of about the same weight as before it was smoked.

Government regulations specifically state that products like ham, pork loin or butts shall not contain more moisture in the finished product than the fresh, uncured product.

SECRET RECIPES

There are a great many people and sausage makers who have their own secret recipes for making a specific sausage. Actually, these secrets are not as well-kept as they may think. Over the years, I have had a great many people ask me about a particular sausage that is traditional to some section of this country or to some specific ethnic group. Obviously, I cannot know all the sausage recipes, but there is sometimes a simple way to find out these much-guarded secrets.

To begin with, practically every sausage made has salt and pepper in it. So now you already have the first two ingredients. Take the simple breakfast sausage; it too has salt and pepper, but the sage you add makes it breakfast sausage. Italian sausage also has salt and pepper, but adding fennel seed makes it Italian. Either of these sausages can be made mild, hot, or very hot by simply adding hot cayenne pepper.

There are a great number of people who simply make a sausage with meat, salt and pepper. Smoke or the meat itself can be the primary flavor. When it's a smoked sausage, Instacure No.1 or some equal product also contributes.

By law, meat processors or sausage makers must put an ingredient label on all the sausage they make, either fresh or smoked. They must state if they are using cures and salt, etc. In some cases they will put on a key spice they use in the sausage.

Setting aside all salt, pepper, and cures, some people can easily detect the other spices. Let's say you detect sage in a breakfast sausage you would like to duplicate. If you can do this, you may go to any recipe in Great Sausage Recipes and locate a formula telling you how much of this spice to use. You will then have an idea of how to make this "secret" breakfast sausage. This is a way to start.

It is not a bad idea to get several people to taste a sausage, then have them write their spice guesses down on pieces of paper and compare notes. With the exception of a few sausages, the most a person would be trying to detect is one or maybe two spices. Obviously, you couldn't do this with wieners or bologna, as they may contain 6, 7 or even 10 different spices, but it can be done with most simple sausages.

CHAPTER VII

Fresh Sausage

DIET SAUSAGE

For home use, a diet sausage is made quite easily, and you'll know the exact contents of the sausage. The formulas and recipes in this book are very clear and products one uses are fully explained.

Probably the easiest sausage of all is a salt-free sausage. You would simply add spices and meat and you have sausage; just omit the salt. The casings are another story. Salted casings should be avoided, as they have an excessive amount of salt even after flushing and soaking. Unsalted casings packed in solution, or collagen casings, would be preferable.

If you like the flavor of smoked sausage, you must use cures to cure the meat. It requires two level teaspoons of Instacure No. 1 to cure 10 lbs. of meat. This small amount can be acceptable in some diets. If it is not, you can simply omit the Instacure No. 1 and add liquid smoke. You would have a smoke flavor but a fresh sausage, not cured. It could be frozen and cooked as needed.

For people on fat-free diets, all is not lost. As we all know, a certain amount of fat in the sausage does help to bind it and keep it moist. You can create this same condition by using soy protein concentrate and water, thus eliminating the fat. Sausage Maker fat replacer is an excellent substitute for fat. U.S.D.A. approved, it is made from oats and adds a juicy flavor to any sausage, fresh or smoked. For 10 lbs. of lean meat you would add around 1 pint of water (1 lb.) and 5 ounces of soy protein concentrate or 1/3 cup of Sausage Maker fat replacer. This may be done with either a fresh or smoked sausage.

FRESH PORK SAUSAGE (BREAKFAST)

INGREDIENTS FOR 25 LBS.

25 lbs. boneless pork butts
2/3 cup salt
2-1/2 Tb. ground white pepper
5 Tb. rubbed sage
2-1/2 tsp. ginger
2-1/2 Tb. nutmeg
2-1/2 Tb. thyme
2-1/2 Tb. ground hot red pepper
(optional)
5 cups ice water

INGREDIENTS FOR 10 LBS.

10 lbs. boneless pork butts
4 Tb. salt
1 Tb. ground white pepper
2 Tb. rubbed sage
1 tsp. ginger
1 Tb. nutmeg
1 Tb. thyme
1 Tb. ground hot red pepper
(optional)
2 Cups ice water

You can make an excellent breakfast sausage using 100% pork butts. This product is of such high quality that it is never seen in a meat market and can only be had by making it yourself. You can also make a breakfast sausage of 50% pork butts and 50% pork trimming and you would still have a sausage of high quality.

All the pork used to manufacture sausage must be chilled at 32-35° F. Be sure that all the meat is free of blood clots, sinews, bone, skin, glands, etc.

GRINDING & MIXING

Grind all the meat through a 3/16" grinder plate and place in mixing tub. Add all the ingredients and mix well until all the spices are evenly distributed.

STUFFING

Pork sausage may be stuffed into 28-30mm hog casings or 22-24mm lamb casings. Pork sausage also may be stuffed into a cloth bag or a 3 1/2"x24" fibrous casing.

It is very important that pork sausage not be allowed to

remain at room temperature any longer than necessary. Place in cooler as soon as possible. Pork sausage should be allowed to chill and dry in 28-32° F cooler.

BROWN AND SERVE SAUSAGE

When making brown-and-serve sausages, add 1 oz. of Instacure No. 1 to a 25 lb. formula, or 2 level teaspoons to a 10 lb. formula. Soy protein concentrate should be added - 2 cups for each 10 lb. of meat.

Brown-and-serve sausages are made by stuffing meat into cellophane casings. Sausage is then cooked in a smoke-house without smoke until an internal temperature of 152° F is attained. Sausage is removed from smoker and showered with cold water. Sausage is then chilled in a cooler until very firm and then cellophane casings are peeled off. This sausage freezes very well.

To prepare sausage, simply brown and serve.

TOMATO SAUSAGE

For added and unusual flavor you may substitute canned tomato juice in place of water.

FRESH POLISH SAUSAGE (KIELBASA)

INGREDIENTS FOR

25 LBS.

2/3 cup salt
2-1/2 Tb. sugar
5 lg. cloves fresh garlic
2-1/2 Tb. coarse black pepper
2 Tb. marjoram
5 cups water
25 lbs. boneless pork butts

INGREDIENTS FOR

10 LBS.

5 Tb. salt
1 Tb. sugar
2 large cloves fresh garlic
1 Tb. coarse black pepper
1 heaping tsp. marjoram
2 cups ice water
10 lbs. boneless pork butts

GRINDING & MIXING

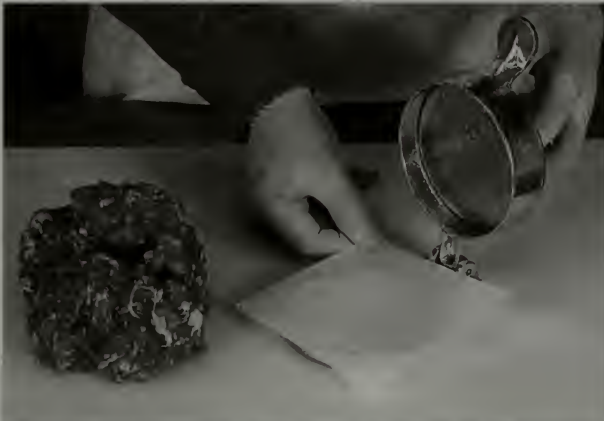
grind all the pork butts through a 1/4 " or 3/8" grinder plate and place in the mixing tub. Add all the ingredients and mix well, until spices are evenly distributed. Deliver to the stuffer using 35-38mm hog casing. Let sausage age overnight in refrigerator for better flavor. Use fresh as soon as possible. Freeze remainder of sausage, after 2 or 3 days for future use.
NOTE:

Be sure that meat has been chilled between 32-34° F. before starting. All blood clots, bones, cords, etc. must be removed and thrown out. Do not keep sausage at room temperature any longer than necessary.

Making Sausage Patties At Home



Waxed patty paper, and a hamburger press are shown. The adjustable press allows you to make meat patties to your specifications for either hamburger, Italian or other patties.



Place a piece of patty paper or regular waxed paper on the hamburger mold.



Meat is then rolled into a ball.



Meat is then placed on the waxed paper and covered by another piece of wax paper.



Meat is then pressed into the mold, forming the patty shape.



Patty is now formed ready to be wrapped for the freezer.

More on Making Patties At Home



Stuffing a low cost plastic burger or wild game bag with sausage.



The sausage is then closed and placed into the freezer for 30-45 minutes until partially frozen.



The sausage is removed from the freezer and sliced. Notice the plastic falls off the patties. Wrap and re-freeze.

ONION SAUSAGE

INGREDIENTS FOR 25 LBS.

25 lbs. pork butts
3/4 cup salt
1/4 cup powdered dextrose
1 cup finely chopped onions
2-1/2 Tb. coarse black pepper
2-1/2 Tb. ground marjoram
5 cups ice water

INGREDIENTS FOR 10 LBS.

10 lbs. pork butts
1/3 cup salt
1-1/2 Tb. powdered dextrose
6 Tb. finely chopped onions
1 Tb. coarse black pepper
1 Tb. ground marjoram
2 cups ice water

grind pork butts through a 3/8" grinder plate and fat meat through a 1/8" grinder plate. Then add all remaining ingredients, mixing until evenly distributed. Sausage is then stuffed into 35-38mm hog casings and placed into 38-40° F cooler for 24 hours before using. Freeze unused portions after a few days of refrigeration.

CHORIZO

INGREDIENTS FOR 25 LBS.

10.5 Tb. salt
2-1/2 cups white vinegar
3/4 cup paprika
1/2 cup hot ground pepper
8 Tb. fresh garlic
2-1/2 Tb. oregano
5 tsp. black coarse pepper
2-1/2 cups water
25 lbs. boned pork butts

INGREDIENTS FOR 10 LBS.

4 Tb. salt
1 cup white vinegar
5 Tb. paprika
3 Tb. hot ground pepper
3 Tb. fresh garlic
1 Tb. oregano
2 tsp. black coarse pepper
1 cup water
10 lbs. boned pork butts

GRINDING & MIXING

grind all the pork butts through a 1/4" grinding plate and place in a mixing tub. Add all the ingredients and mix well until all the spices are evenly distributed. Chorizo is to be stuffed into a 38-42mm hog casing. Place on smokesticks and let dry in cooler overnight. This particular sausage takes much longer to dry than most others.

While living in Las Vegas for 20 years, I developed a taste for Mexican food. I became friends with Pedro Bossey, who gave me this recipe for chorizo.

COOKED CHORIZO LOAF

A chorizo loaf can be made simply by adding 1 oz. of Instacure No. 1 to 25 lbs. of meat or one level teaspoon for each 5 lbs. of meat. Also, soy protein concentrate should be added with some water. (14 ozs. of soy protein for 25 lbs. and 3 ozs. to each 5 lbs. of meat.)

Stuff the meat into baking pans and place in an oven or smokehouse at 170 degrees F until the internal temperature reaches 155 degrees F. You may also stuff this mixture into any size fibrous casing.

FRESH ITALIAN SAUSAGE - SWEET

INGREDIENTS FOR

25 LBS.

2/3 cup salt
5 cups ice water
2-1/2 Tb. cracked fennel seed
5 tsp. coarse black pepper
2-1/2 Tb. sugar
25 lbs. boned pork butts

INGREDIENTS FOR

10 LBS.

4 Tb. salt
2 cups ice water
3 tsp. fennel seed
2 tsp. coarse black pepper
1 Tb. sugar
10 lbs. boned pork butts

GRINDING & MIXING

grind all the pork butts through a 1/4" or 3/8" plate and place into the mixing tub. Add all the ingredients and mix well until evenly distributed. Stuff into 32-35mm hog casing.

NOTE:

Be sure that the meat has been chilled to 32-34° F before starting. All blood clots, cords, bones, etc. must be removed and thrown out. Do not keep sausage at room temperature any longer than necessary.

SMOKING

The smoking of Italian sausage has become more and more popular in recent years. Simply place sausage in pre-heated smokehouse at 130° F with dampers wide open until the casings are dry. gradually increase temperature to 160-165° F.

Applying medium smoke with dampers 1/4 open, hold in smokehouse until you obtain internal temperature of 152° F. Remove and shower with cool water quickly so internal temperature is reduced to 110° F. Allow to hang at room temperature until desired bloom is obtained, remove to cooler and hold overnight.

When smoking Italian sausage, add 1 oz. of cure (Instacure No. 1) to 25 lb. formula or 2 level teaspoons to a 10 lb. formula. Soy protein concentrate should also be added as called for in any smoked sausage recipe of this book.

FRESH ITALIAN SAUSAGE - MILD-HOT

INGREDIENTS FOR 25 LBS.

2/3 cup salt
5 cups ice water
2.5 Tb. cracked fennel seed
2 Tb. coarse black pepper
2-1/2 Tb. sugar
2-1/2 Tb. crushed hot peppers
1 Tb. caraway seeds
2-1/2 Tb. coriander
25 lbs. boneless pork butts

INGREDIENTS FOR 10 LBS.

4 Tb. salt
2 cups ice water
1 Tb. cracked fennel seed
2 tsp. coarse black pepper
1 Tb. sugar
1 Tb. crushed hot peppers
1 tsp. caraway seeds
1 Tb. coriander
10 lbs. boneless port butts

GRINDING & MIXING

grind all the pork butts through 1/4" or 3/8" grinder plate. Place into the mixer and add all the ingredients. Mix well until all the spices are evenly distributed. Stuff into a 32-35mm hog casing.

NOTE:

Be sure that the meat has been chilled to 32-34° F before starting. All blood clots, bones, cords, etc. must be removed and thrown out. Do not keep sausage at room temperature any longer than necessary. Freeze unused portions after a few days of refrigeration.

ENGLISH BANGERS

INGREDIENTS FOR 10 LBS.

2 tsp. ground white pepper
1 tsp. ground ginger
1 tsp. sage
1 tsp. mace
4.5 Tb. salt
1 cup bread crumbs
10 lbs. fat pork butts

PROCESSING PROCEDURE

Meat is chilled to 32-34° F and ground through 1/4" grinding plate. All ingredients are mixed very well with about 2 cups of water. When possible, add cooled pork stock in place of water. Meat is then stuffed into 32-35mm hog casings and whatever sausage not used up is frozen.

English bangers are a very tasty sausage served at breakfast time, much the same as American pork sausage.

The above formula may be used to make all beef breakfast sausage. Use any kind of beef or trimmings, 70% lean and 30% fat.

CABBAGE PORK SAUSAGE

INGREDIENTS FOR 10 LBS.

- 1 Tb. ground white pepper
- 2 Tb. sage
- 1 tsp. ground ginger
- 1 Tb. ground nutmeg
- 1 Tb. thyme
- 1 Tb. ground hot red pepper
- 5 Tb. salt
- 1 Tb. sugar
- 1 small onion
- 3-1/2 lbs. cabbage (core removed)
- 10 lbs. boneless pork butts

A very good pork sausage is made using 100% pork butts, rather on the fat side. Commercial pork sausage usually is made of about 50% meat and 50% fat. The ideal pork sausage is about 30% fat and 70% meat, or a pork butt on the fatty side.

Cabbage is quartered and boiled in water until tender. Cabbage is then removed and allowed to drain and cool. It is then ground through 3/16" or 1/4" grinder plate along with onions and meat. Add all ingredients and mix very well, stuffing into a 22-24mm sheep casing. Remove to cooler or freeze. This sausage is prepared like regular breakfast sausage.

KOSHER STYLE BEEF SAUSAGE - FRESH

INGREDIENTS FOR 25 LBS.

2.5 Tb. ground white pepper
2.5 Tb. ground nutmeg
1 Tb. ground ginger
2-1/2 Tb. thyme
2-1/2 Tb. rubbed sage
3/4 cup salt
1/2 cup sugar
5 cups ice water
25 lbs. chuck

INGREDIENTS FOR 10 LBS.

1 Tb. ground white pepper
1 Tb. ground nutmeg
1 tsp. ground ginger
1 Tb. thyme
1 Tb. rubbed sage
5 Tb. salt
3 Tb. sugar
2 cups ice water
10 lbs. chuck

The meats selected for this sausage should be very high quality and bright in color. Remove all the blood clots, sinews, and gristle. Be sure the meat has been kept at 28-32° F. before grinding.

GRINDING & MIXING

grind all the meats through a 3/8" to 1/2" grinder plate. Place into a mixing tub and add all the ingredients, mix until evenly distributed. (if necessary, you may add ice to keep the meat at 32-34° F) Regrind through 1/8" grinder plate. Remove to stuffer packing tightly and use about 22-24mm lamb casings. Remove to cooler after stuffing.

SICILIAN-ITALIAN SAUSAGE WITH WINE AND CHEESE

INGREDIENTS FOR 25 LBS.

20 lbs. pork butts
5 lbs. lean beef (chuck is okay)
5 Tb. powdered dextrose
2-1/2 Tb. cracked black pepper
2/3 cup salt
1/2 cup cracked fennel seed
5 Tb. red crushed peppers
5 cups wine-chablis
1 cup Romano Pecorino

INGREDIENTS FOR 10 LBS.

8 lbs. pork butts
2 lbs. lean beef (chuck is okay)
2 Tb. powdered dextrose
1 Tb. cracked black pepper
4 Tb. salt
3 Tb. cracked fennel seed
2 Tb. red crushed peppers
2 cups wine-chablis
6 Tb. Romano Pecorino

The Romano cheese must be broken or cut up into smaller sized pieces so that it fits into your grinder. grind cheese through a 3/8" grinder plate at least twice. This breaks it down to a powdery consistency so it can be mixed easily with the meat.

Grind meat through a 3/8" grinder plate and place in a mixing tub. Add the remaining ingredients and mix thoroughly until evenly distributed. Stuff into 32-35mm hog casing. You may also make this sausage in patties if you like.

This particular sausage tastes best if it is cooked shortly after it is made. It is a good idea to prepare only what you can use up in a couple days. This sausage may be frozen, but the longer it is kept frozen, the more dominant the Romano cheese flavor will become.

Of all the types of Italian sausage made, this is my favorite. It is a sausage usually made during the Christmas and Easter holidays. Many thanks to Leonard Arcadepane of Las Vegas, Nevada who taught me how to make this sausage, and also for his recipe.

HOT WHOLE HOG SAUSAGE

INGREDIENTS FOR 100 LB. BATCHES

1 cup ground black pepper
1 cup sage
1/4 cup ground ginger
3 Tb. ground nutmeg
4 Tb. thyme
1-1/2 lb. salt
1/4 cup ground hot pepper (optional)

TYPE OF HOGS

This type of sausage is made from sows weighing about 300 to 400 lbs. Needless to say, this sausage is made as fast as possible. All spices should be premixed in advance and all utensils should be clean, ready and waiting. If the hog is ground up promptly, and the above instructions are followed, the bacteria count in the sausage will be very low and this in turn will help to extend the flavor of the sausage a great deal. It is worthwhile to note that the carcass of the hog is practically bacteria-free right after the slaughter.

A great many large sausage manufacturers have switched to this method of making pork sausage. Obviously, it saves on the refrigeration expense and gives the product a longer shelf life as well. Ordinarily, the meat has to be refrigerated for a day or so, and when great volumes are involved, this process can save large amounts of money for the processors.

PROCESSING

A hog may be skinned right on the rail and then boned. Cut into strips 3" to 6." After all the meat is boned and the skin removed, quickly inspect all the meat for blood clots and throw them out. The end product should be 60% lean and 40% fat. If the meat is too fat, remove one of the fat backs.

After all the meat is weighed, grind through a 3/16" grinder plate and place into the mixer. Add all the ingredients and mix well. Place into the cooler overnight in tubs or pans 5 to 6

inches deep.

QUICK CHILL IS NECESSARY TO PREVENT SOURING OR GASSING OF THE PRODUCT, SO DO NOT OVERLOAD THE PANS OR TUBS. After chilling, sausage may be stuffed in cloth bags or fibrous casings 31/2" by 24".

NOTE:

THIS ENTIRE BATCH OF SAUSAGE SHOULD BE MADE DURING A PERIOD OF TIME WHEN THE MEAT WILL NOT DROP BELOW 85° F. IF THE MEAT DROPS BELOW THIS TEMPERATURE THE SPICES DO NOT MIX WELL WITH THE MEAT AND THE CHANCE OF SOURING IS GREATER.

SWEDISH POTATO SAUSAGE

INGREDIENTS FOR 25 LBS.

1 medium cut up onion or
2/3 cup of granulated onions
2-1/2 Tb. salt
4 Tb. ground white pepper
1 Tb. allspice
2-1/2 cups non-fat dry milk
2-1/2 cups water
7-1/2 lbs. raw peeled potatoes or
2 lbs. potato flour
12-1/2 lbs. pork butts
5 lbs. boneless beef

INGREDIENTS FOR 5 LBS.

1 onion small size, cut up or
4 Tb. granulated onion
1 Tb. salt
1 1/2 tp. ground white pepper
1 tsp. allspice
1 cup non-fat dry milk
1 cup water
6 potatoes, pared & cut up
(6 cups)
1 1/2 lbs. pork butts
1 lb. lean boneless beef

GRINDING & MIXING

grind the meat, potatoes, and onions through a 3/8" grinder plate and place in a mixing tub. Add all the other ingredients with the water and mix well. After this procedure, regrind through the 3/8" plate. Stuff into a 35-38mm hog casing.

This sausage is a very perishable product. It keeps best when frozen. This sausage may be served fried, baked or boiled. When kept in a refrigerator, sausage should be placed in container and covered with water.

CHAPTER VIII

Smoked and Cooked Sausage

EMULSIFIED SAUSAGES

Bologna, wieners and products of this type use a very finely textured meat. These types of sausages are made with what is known as emulsified meat. There are a lot of people who would like to make a sausage of this type at home but have had nothing but failure in trying to achieve these results. A simple grinder will not do the job. All you would do is regrind the meat over and over and wind up with a very poor-looking product. It definitely would not appear appetizing. Until just recently, it wasn't possible to do; however, since the introduction of the food processor, it is possible to produce small amounts of these sausages at home.

In using a small food processor at home to make emulsified sausage, there are only one or two rules to follow. Due to the size of these machines, it is always better to buy one that has a direct-drive shaft to turn the cutting knife. The giant meat emulsifiers are made this way. The food processors with belt drives are not quite so durable.

IN EITHER CASE, THE MEAT SHOULD BE GROUND FIRST AND ALL THE INGREDIENTS (EXCEPT THE WATER) SHOULD BE MIXED VERY THOROUGHLY UNTIL EVENLY DISTRIBUTED. THEN PLACE THE MEAT IN THE FOOD PROCESSOR A LITTLE AT A TIME, ADDING A LITTLE WATER AS YOU GO ALONG. YOU SHOULD BE ABLE TO EMULSIFY THE MEAT TO SUCH A POINT THAT THE END RESULT WILL BE PRETTY CLOSE TO A STORE-BOUGHT WIENER, BRATWURST OR BOLOGNA.

Emulsifying Meat at home with a Food Processor

The introduction of food processors in recent years has now made it easier to produce a fine-textured sausage at home. Although not as perfect as a \$50,000 meat chopper, it still produces a reasonable facsimile of wieners or bologna at home.



Meat must first be ground using a 1/4" grinding plate.



The seasonings are then thoroughly mixed with the meat, omitting water.



The meat is then placed into the food processor, adding ice cold water to help emulsify the meat. Adding water in this step also reduces the strain on the motor of your food processor.



Above photo shows emulsified meat after 3 minutes. Water has been added to reach this stage.

Many people would think that a good time to add a lot of undesirable products to sausage, such as fat, would be when you're emulsifying it. This situation is only remotely possible.

Today with a computer practically any decent-sized sausage kitchen can have a computerized fat analyzer. Since sausage is made in 300-, 500- and even 1000-lb. loads, the meat is checked by the USDA inspector on the spot. If the fat content is too high, the sausage maker is forced to put more lean meat into the batch to bring it up to USDA specifications. If not, it is not allowed to be made into sausage. There is a limit of 30% fat for any and all sausages that can't be exceeded by federal law. All state and local health departments enforce this law.

BRATWURST

INGREDIENTS FOR 25 LBS.

5 cups of whole milk, ice cold
9 whole eggs
5 cups soy protein concentrate
2-1/2 Tb. ground white pepper
2-1/2 Tb. mace
1 Tb. ginger
2-1/2 Tb. nutmeg
2/3 cup salt
5 lbs. boneless veal
12 1/2 lbs. fresh pork shoulders
7 1/2 lbs. lean pork trimmings

INGREDIENTS FOR 10 LBS.

2 cups whole milk, ice cold
3 whole eggs
2 cups soy protein concentrate
1 Tb. ground white pepper
1 Tb. mace
1 tsp. ginger
1 Tb. nutmeg
4 Tb. salt
2 lbs. boneless veal
5 lbs. fresh pork shoulders
3 lbs. lean pork trimmings

GRINDING & MIXING

Grind all the meat through a 3/8" grinder plate. Place in the food processor adding all the ingredients until evenly distributed and emulsified. Meat should then be stuffed into a 32-35mm hog casing.

NOTE:

Bratwurst is sold in three different ways: fresh, cooked or smoked. If you wish, bratwurst may be placed into the freezer right after it is made. It can be cooked just before it is used. You may place bratwurst into a cooker at 160° F and keep it there until an internal temperature of 152° F is obtained.

If you wish to smoke bratwurst, place in a preheated smokehouse at 130° F with dampers wide open for about 1 hour or until the casings are dry. After 1 hour, close dampers to 1/4 open, gradually increase the temperature to 165° F and hold it at that level until an internal temperature of 152° F is obtained. In either case, after smoking or cooking, sausage should be removed and placed under a shower until the internal temperature is reduced to around 110° F.

If you are going to smoke bratwurst, add 5 tsp. of cure (Instacure No. 1) to the 25 lb. formula or 2 level teaspoons to the 10 lb. formula.

The above bratwurst was a sausage made for and served by Alpine Village, Hofbrau and several other restaurants in Las Vegas, Nevada during my ownership of the Hickory Shop Inc. in the mid-60s.

One of the biggest compliments I ever received was from Mrs. Ann Buckingham of Las Vegas. She told me that the bratwurst I made was better than any she ever bought in Germany. Ann was from Hamburg, Germany, became a G.I. war bride, and still lives in the U.S.A. The bratwurst I made for her was coarse-meat variety. Most Americans are not familiar with this bratwurst, as they prefer the emulsified type.

BOCKWURST

INGREDIENTS FOR

25 LBS.

5 cups of whole milk
3/4 cup salt
1/2 cup powdered dextrose
2-1/2 Tb. mace
2-1/2 Tb. ground celery
2/3 cup onion powder
2.5 Tb. ground white pepper
1 bunch fresh chopped chives
or green onions
2.5 Tb. chopped parsley
1 Tb. grated lemon peel
8 fresh whole eggs
7-1/2 lbs. boneless veal
12-1/2 lbs. lean pork shoulder
5 lbs. pork trimmings

INGREDIENTS FOR

10 LBS.

2 cups whole milk
5 Tb. salt
2 Tb. powdered dextrose
1 Tb. mace
1 Tb. ground celery
4 Tb. onion powder
1 Tb. ground white pepper
6 pcs. chives or green onions,
chopped
6 pcs. chopped parsley
1 piece grated lemon peel
3 fresh whole eggs
3 lbs. boneless veal
5 lbs. lean pork shoulder
2 lbs. pork trimmings

GRINDING

Grind all the meat through a 3/8" grinder plate, adding all the ingredients, and mix. Place in food processor and emulsify. Follow emulsify instructions on page 200.

STUFFING AND COOKING

Bockwurst is to be stuffed into a lamb casing 24-26mm in size and made in links 4-6 inches long; then hung on clean smokesticks. (Do not use a smokestick that can stain the casings, as bockwurst is a white sausage.) Sausage should be placed into the cooker or water and cooked until the internal temperature reaches 152° F. (Be sure the water temperature is not above 165° F). Place cooked sausage under shower for about 10 minutes to reduce internal temperature to 110° F and remove to cooler overnight. This sausage also can be frozen and cooked as it is needed.

Bockwurst also is made as a very fine-textured sausage (emulsified) in the Western New York area. It is very popular at Easter time and also goes under the name of "white hot dogs."

KNOCKWURST

INGREDIENTS FOR 25 LBS.

5 cups ice water
2.5 cups non-fat dry milk
3/4 cup salt
2/3 cup powdered dextrose
5 tsp. Instacure No. 1
3/4 cup ground white pepper
2-1/2 Tb. mace
1-1/2 tsp. ground allspice
2-1/2 tsp. coriander
5 Tb. paprika
2-1/2 tsp. garlic powder (optional)
17-1/2 lbs. boneless veal
7-1/2 lbs. pork trimmings
or
17-1/2 lbs. boneless beef
7-1/2 lbs. pork trimmings

INGREDIENTS FOR 10 LBS.

2 cups ice water
1 cup non-fat dry milk
5 Tb. salt
4 Tb. powdered dextrose
2 level tsp. Instacure No. 1
5 Tb. ground white pepper
1 Tb. mace
1/2 tsp. ground allspice
1 tsp. coriander
2 Tb. paprika
1 tsp. garlic powder (optional)
7 lbs. boneless veal
3 lbs. pork trimmings
or
7 lbs. boneless beef
3 lbs. pork trimmings

GRINDING & STUFFING

Grind all the meat through a 3/16" grinder plate, add all the ingredients and mix well. Place in a food processor and emulsify. Follow emulsify instructions on page 200. Sausage should then be stuffed into small or medium beef rounds or 38-42mm hog casings. Place sausage on smokesticks, properly spaced.

SMOKING

Knockwurst is placed in a smokehouse that is preheated 130-135° F with dampers wide open. Keep at this temperature for about 1 hour or until the product is fully dry. Smokehouse temperature then should be raised to about 150° F applying smoke and held there for 1 hour, or until the desired color is obtained. You may increase smoker temperature to 165° F and cook until internal temperature reaches 152 degrees F without smoke, or you may remove to the cooker until the 152° F is obtained internally. If you are cooking in water, be sure the water temperature is not over 165° F .

NOTE:

Knockwurst usually is not smoked very dark; however, this is optional.

WIENERS (FRANKFURTERS)

INGREDIENTS FOR 25 LBS.

5 cups ice water
5 tsp. Instacure No. 1
2/3 cup paprika
1 cup ground mustard
2-1/2 tsp. ground black pepper
2-1/2 tsp. ground white pepper
2-1/2 tsp. ground celery seeds
2-1/2 Tb. mace
2-1/2 tsp. garlic powder
2/3 cup salt
5 cups non-fat dry milk or
soy protein concentrate
2/3 cup powdered dextrose
15 lbs. lean beef (chuck)
10 lbs. lean pork trimmings
(pork butts)

INGREDIENTS FOR 10 LBS.

2 cups ice water
2 level tsp. Instacure No. 1
4 Tb. paprika
6 Tb. ground mustard
1 tsp. ground black pepper
1 tsp. ground white pepper
1 tsp. ground celery seeds
1 Tb. mace
1 tsp. garlic powder
4 Tb. salt
2 cups non-fat dry milk or
soy protein concentrate
4 Tb. powdered dextrose
6 lbs. lean beef (chuck)
4 lbs. lean pork trimmings
(pork butts)

You may use 1 oz. coriander in place of the mace. If a wiener of lighter color is desired, omit the paprika.

Wieners can be made from many different meats, as well as any combination of meats. In some cases, people want to use the leftovers when they butcher their livestock, while others prefer a quality wiener.

GRINDING & MIXING

For home use, grind the meat together using a plate with very fine holes 3/16". After grinding, mix all the meat with above ingredients. Mix for 2-3 minutes or until all ingredients are evenly distributed with the meat. Emulsify meat - following emulsifying instructions on page 200, pack into stuffer using a 24-26mm sheep casing to stuff wieners.

SMOKING AND COOKING

After stuffing, hang wieners on properly spaced smoke-house sticks. Be sure wieners are not touching each other. You may rinse the wieners off with cold water if necessary.

Allow wieners to hang at room temperature when using natural casings (about 1 hour). When using collagen or synthetic casings, hang at room temperature for about 30 minutes. Wieners should be smoked as follows:

Place into pre-heated smokehouse and dry for approximately 30 minutes. Apply heavy smudge for approximately 90 minutes, gradually raise smokehouse temperature to 165° F and smoke until internal temperature of 138° F. Transfer to steam cabinet cooker and cook at 165° F for 5-10 minutes, or until an internal temperature of 152-155° F is obtained. Spot-check various wieners to be sure that these temperatures are reached.

If you do not have a steam cabinet, you may leave the wieners in the smokehouse at 165° F until you obtain 152° F internally.

After smoking or cooking, the wieners should be quickly showered with cool water for about 10 minutes or until the internal temperature is reduced to 100-110° F. After showering with cold water, allow wieners to chill and dry at room temperature or until desired bloom is obtained.

CHILLING

Wieners should be placed in 45-50° F cooler and chilled until product has reached an internal temperature of 50° F.

TURKEY OR CHICKEN WIENERS

INGREDIENTS FOR

25 LBS.

20 lbs. raw, boneless
turkey or chicken
3 lbs. chicken or turkey fat
5 cups semolina flour
5 tsp. Instacure No. 1
2/3 cup salt
2.5 Tb. ground white pepper
4 cups turkey or chicken stock
2 cups non-fat dry milk
5 cups ice water

INGREDIENTS FOR

10 LBS.

8 lbs. raw, boneless
turkey or chicken
1 lb. chicken or turkey fat
1-3/4 cups semolina flour
2 tsp. Instacure No. 1
4 Tb. salt
1 Tb. ground white pepper
1-1/2 cups turkey or chicken stock
3/4 cup non-fat dry milk
2 cups ice water

All meat and fat must be chilled to 30-32° F. and then ground through a 3/16" grinder plate. Add remaining ingredients, except stock, and mix thoroughly.

Then place mixture in a food processor a little at a time, adding the stock as you go along. Chop the mixture in the food processor until emulsified, being careful not to overwork. Stuff mixture in 24- 26mm sheep casings and let it dry at room temperature for about 30-40 minutes.

Put wieners in a preheated smoker at 120-130° F. with damper and vent wide open. After wieners are dry, close damper and vent and apply smoke for 20-30 minutes. Then increase temperature to 160° F. at a rate of 10 degrees every 10 minutes. Continue this process until the internal temperature reaches 152° F. Then place the wieners under a cool shower of water until internal temperature is reduced to 85-90° F.

NOTE:

Bouillon cubes or chicken base may be used to make stock.

VIENNA SAUSAGE

INGREDIENTS FOR

25 LBS.

9 lbs. lean beef
9 lbs. lean veal
7 lbs. lean pork
5 cups ice water
5 tsp. Instacure No. 1
1/2 cup powdered dextrose
1-1/4 cup wheat flour
2/3 cup salt
2-1/2 Tb. ground nutmeg
2-1/2 tsp. ground coriander
1-1/2 tsp. ground cardamon
1-1/2 tsp. ground cloves

INGREDIENTS FOR

10 LBS.

4 lbs. lean beef
4 lbs. lean veal
2 lbs. lean pork
2 cups ice water
2 tsp. Instacure No. 1
3 Tb. powdered dextrose
1/2 cup wheat flour
4 Tb. salt
1 Tb. ground nutmeg
1 tsp. ground coriander
1/2 tsp. ground cardamon
1/2 tsp. ground cloves

Grind the meat through a 3/16" grinder plate. Add the remaining ingredients, except water, mixing thoroughly. Place the meat in a food processor and emulsify it, adding the water as you go along. Then stuff the mixture into 24-26mm sheep casings. Hang at room temperature for 30-40 minutes or until dry. Place in a preheated smokehouse at 150° F and hold there for 1 hour. Raise temperature to 165° F., holding until internal temperature reaches 152° F. Vienna sausage is not smoked.

LARGE, LONG AND RING BOLOGNA

INGREDIENTS FOR

25 LBS.

5 cups ice water
5 tsp. Instacure No. 1
2-1/2 Tb. ground white pepper
5 Tb. paprika
2-1/2 Tb. nutmeg
2-1/2 tsp. allspice
2-1/2 tsp. onion powder
1 cup salt
5 cups non-fat dry milk or
soy protein concentrate
15 lbs. lean beef (chuck)
10 lbs. pork butts

INGREDIENTS FOR

10 LBS.

2 cups ice water
2 level tsp. Instacure No. 1
1 Tb. ground white pepper
2 Tb. paprika
1 Tb. nutmeg
1 tsp. allspice
1 tsp. onion powder
1/3 cup salt
2 cups non-fat dry milk
or soy protein concentrate
6 lbs. lean beef (chuck)
4 lbs. pork butts

GRINDING

Grind all the meat using a plate with very fine 3/16" holes. After grinding, mix all the ingredients with water and meat. Mix for 2-3 minutes or until all the ingredients are evenly distributed. Place in food processor and emulsify. Follow emulsified sausage instructions on page 200. If you do not have a mechanical mixer or silent cutter and are mixing by hand, it will take longer than 3 minutes to distribute the ingredients.

STUFFING

Bologna may be stuffed in large cellulose casings, beef bungs or export wide beef rounds for the ring bologna. There are hog casings available that can be used for ring bologna.

SMOKING AND COOKING

After stuffing, hang on properly spaced smokehouse sticks. You may rinse with cold water to remove meat particles. After stuffing, bologna should be kept in a cooler at 40-45° F. until you are ready to smoke. Bologna should be taken out of the cooler and allowed to hang at room temperature for at least 1 hour before smoking.

Bologna packed in artificial casings should be placed in a preheated smokehouse at 130-135° F for about 1/2 hour with dampers wide open; apply heavy smudge for approximately 1 1/2- 3 hours with dampers 3/4 closed. Gradually raise the temperature to 165-170° F, cutting off the smudge, and cook until an internal temperature of 155° F is obtained. If you have a steam cabinet, you may transfer bologna from the smokehouse and cook until an internal temperature of 155° F is obtained.

When using natural casings, bologna should be placed in a smokehouse at 130-135° F with dampers wide open for at least 30-45 minutes. Then apply heavy smudge for 2 1/2-3 hours or until the desired color is obtained. Cut smudge, gradually raise the smokehouse temperature to 165° F and cook until an internal temperature of 135° F is obtained. Remove from smoker and place in steam cabinet until 155° F is obtained internally. If you do not have a cooker, leave bologna in the smokehouse at 165-170° F until 155° F is obtained internally. Remove from smokehouse and spray with cool water until an internal temperature of 110° F is obtained.

CHILLING

Bologna should be placed in a cooler at 45° F until the internal temperature of the product reaches at least 50° F.

SMOKED POLISH SAUSAGE (KIELBASA)

INGREDIENTS FOR

25 LBS.

5 cups ice water
5 cups soy protein
concentrate or non-fat dry milk
3/4 cup salt
2-1/2 Tb. sugar
5 tsp. Instacure No. 1
2-1/2 Tb. black pepper coarse
3 Tb. fresh garlic
2-1/2 Tb. marjoram
25 lbs. boneless pork butts

INGREDIENTS FOR

10 LBS.

2 cups ice water
2 cups soy protein concentrate
or non-fat dry milk
5 Tb. salt
1 Tb. sugar
2 tsp. Instacure No. 1
1 Tb. black pepper coarse
2 large cloves fresh garlic
1 heaping tsp. marjoram
10 lbs. boneless pork butts

GRINDING & TRIMMING

Trim off excess fat, remove all blood clots, bone, sinews, cords, etc. and throw out. Grind all the lean meat through a 3/8" grinder plate and all the fat meat through 3/16" plate. Place in mixing tub, adding all the ingredients and mixing until evenly distributed.

STUFFING

Polish sausage should be stuffed into a larger-size hog casing, preferably 38-42mm. Sausage then is placed on smokehouse sticks and spaced properly. Dry the sausage as follows:

(1) When stuffing the sausage, it normally is hung on the sausage sticks in the room where you are working. By the time you are finished stuffing the sausage, much of it already is dry. You may put it in a preheated smokehouse at 130° F with dampers wide open for about 1 hour or until casings are dry and starting to take on a brown color.

(2) Or, you may place sausage in a cooler and leave until the casings are dry.

SMOKING

Sausage is placed in a preheated smokehouse at 130° F

with dampers wide open. Keep this temperature until the casings are dry. Gradually increase temperature of smokehouse to 160-165° F with dampers 1/4 open. Apply heavy smoke and keep in smoker until the internal temperature reaches 152° F

If you are using a steam cabinet, remove the sausage from the smoker when it has an internal temperature of 135° F and cook in the steam cabinet to reach 152° F internally. Remove from smokehouse and shower with cold tap water until the internal temperature is reduced to 110° F. Allow the sausage to hang at room temperature for about 30 minutes or until the desired bloom is obtained. Place in cooler at 38-40° F overnight.

BEER SAUSAGE

During the mid-1960's, when I was owner of the Hickory Shop in Las Vegas, the beer sausage made its mark. Probably 80% of the bar owners in Las Vegas were selling this sausage. When they placed their initial orders, they were sold a 4-quart electric cooker. To prepare this sausage they would pour in a 1/2 can of beer and simply let the sausage steam cook in the beer. Hence, the name "beer sausage."

After being cooked, the sausage was served on a napkin or a paper plate. Some of the owners provided mustard or crackers and others just the sausage, steam-cooked in beer. This sausage was so popular that it quickly became our number one sausage, and we were producing up to 4000 lbs. a week.

Beer sausage was made simply by using the smoked Polish sausage recipe, but adding hot cayenne pepper. The degree of hotness varied from bar to bar and it was made from mildly hot to very hot. Four ounces of hot cayenne pepper to 100 lbs. of meat will make a hot sausage, and 1/2 this amount or 2 ounces makes a mild-hot sausage. For a 10 lb. recipe, 1 teaspoon will make a mild-hot sausage. Add two teaspoons and you'll have a hot sausage.

BIERWURST

INGREDIENTS FOR 25 LBS.

15 lbs. lean pork butts
7 lbs. lean beef
3 lbs. fresh bacon
2/3 cup salt
5 tsp. Instacure No. 1
5 Tb. powdered dextrose
2-1/2 Tb. ground black pepper
2-1/2 tsp. ground nutmeg
3/4 tsp. cardamon
3 cloves fresh garlic
2.5 Tb. whole mustard seeds

INGREDIENTS FOR 10 LBS.

7 lbs. lean pork butts
2 lbs. lean beef
1 lb. fresh bacon
4 Tb. salt
2 tsp. Instacure No. 1
2 Tb. powdered dextrose
1 Tb. ground black pepper
1 tsp. ground nutmeg
1/4 tp. cardamon
1 small garlic clove
1 Tb. whole mustard seeds

Grind the lean pork butts and beef through a 3/4" grinder plate or cut into 1" cubes. Add the remaining ingredients and mix thoroughly until evenly distributed. Pack the meat into a container not more than 6" high, making sure there are no air pockets. Place this mixture in a cooler overnight, along with the fresh bacon. The next day, regrind this mixture through a 3/16" grinder plate, and grind the bacon through a 1/4" grinder plate.

Combine the mixtures and stuff into a sewed beef casing or small beef bladder. Allow to dry at room temperature for at least one hour. Then place the sausage in a preheated smokehouse at 130° F. with the dampers and drafts wide open. Allow to dry for 45 minutes or until the sausage starts to take on a brown color. At this point, move the draft to 1/4 open and increase the temperature to 160-165° F and begin smoking. Bierwurst is finished when an internal temperature of 152° F is reached. Place in cooler overnight before using.

SMOKED PORK SAUSAGE (BREAKFAST)

INGREDIENTS FOR

25 LBS.

5 cups ice water
5 tsp. Instacure No. 1
2/3 cup salt
2-1/2 Tb. ground white pepper
5 Tb. rubbed sage
2.5 tsp. ground ginger
2.5 Tb. ground nutmeg
2.5 Tb. thyme
2-1/2 cups soy protein concentrate
10 lbs. pork trimmings
15 lbs. pork butts

INGREDIENTS FOR

10 LBS.

2 cups ice water
2 level tp. Instacure No. 1
4 Tb. salt
1 Tb. ground white pepper
2 Tb. rubbed sage
1 tsp. ground ginger
1 Tb. ground nutmeg
1 Tb. thyme
1 cup soy protein concentrate
4 lbs. pork trimmings
6 lbs. pork butts

GRINDING & CHOPPING

Be sure that all the pork used has been chilled to about 32-35° F. In addition, pork should be free of blood clots, bones, sinews, etc. Grind all the meats through a 1/4" or 3/16" grinder plate. Place in mixer until ingredients are evenly distributed with spices. Stuff into sheep casings 22-24mm or small hog casings, if available.

SMOKING

Hang on smokesticks, properly spaced, and let dry at room temperature until casings are dry. Remove to a pre-heated smokehouse at about 120° F with dampers wide open. Gradually increase temperature to 160° F and apply a heavy smoke; then reduce the temperature to 150° F and maintain until an internal temperature of 142° F is obtained. Remove from smoker, place under cold water shower and reduce internal temperature to 110° F. Let dry at room temperature until desired bloom is obtained. Remove to cooler overnight.

LINGUISA (LONGANIZA)

INGREDIENTS FOR 25 LBS.

2/3 cup salt
5 Tb. powdered dextrose
5 tsp. Instacure No.1
18 cloves fresh garlic
1 cup wine or cider vinegar
2/3 cup paprika
2-1/2 Tb. ground black pepper
2-1/2 Tb. marjoram
5 cups ice water
2-1/2 cups soy protein
concentrate or non-fat dry milk
25 lbs. pork butts

INGREDIENTS FOR 10 LBS.

4 Tb. salt
2 Tb. powdered dextrose
2 level tp. Instacure No.1
6-8 large garlic cloves
1/4 cup wine or cider vinegar
4 Tb. paprika
1 Tb. ground black pepper
1 Tb. marjoram
2 cups ice water
1 cup soy protein
concentrate or non-fat dry milk
10 lbs. of pork butts

CHOPPING

Dice or chop all the meat in 1/2" to 3/4" pieces and place in the mixer.

MIXING

After the meat has been placed in the mixing tub, add all the ingredients except the water and wine or vinegar. Mix until all the ingredients are evenly distributed. Place the meat into curing tubs and let stand in cooler overnight. The next morning place the meat into a mixing tub, add the water and vinegar (mix the vinegar with the water) and mix very well.

STUFFING

Stuff into 35-38mm hog casings and hang on smoke sticks. Allow the sausage to air dry before placing in the smokehouse. After the sausage is dry, place into cool smokehouse overnight at 100-110° F. The next morning raise the temperature to 130-135° F and hold this temperature until the sausage firms up.

Remove sausage from smokehouse and allow to hang at

room temperature before placing into 40-45° F. cooler overnight.

NOTE:

The USDA regulations class "linguisa" as an uncooked sausage. It is therefore necessary to use certified frozen pork to manufacture this product. The above outlined procedure does not conform to government regulations concerning the destruction of live trichinae. See page 40 for destroying trichinae.

MORTADELLA

INGREDIENTS FOR 25 LBS.

3/4 cup salt
5 Tb. gelatin
5 tp. Instacure No. 1
5 cups non-fat dry milk
1-1/2 cup corn syrup solids
5 cloves fresh garlic
2.5 Tb. ground black pepper
2.5 Tb. ground mace
2.5 Tb. coriander
1-1/2 tsp. cinnamon
2/3 cup good Italian wine
5 cups ice water
20 lbs. lean pork butts
2 lb. pork snouts
3 lbs. pork back fat

INGREDIENTS FOR 10 LBS.

5 Tb salt
2 Tb. gelatin
2 level tsp. Instacure No. 1
2 cups non-fat dry milk
8 Tb. corn syrup solids
2 large cloves fresh garlic
1 Tb. ground black pepper
1 Tb. ground mace
1 Tb. coriander
1/2 tsp. cinnamon
4 Tb. good Italian wine
2 cups ice water
8 1/2 lbs. lean pork butts
1/2 lb. pork snouts
1 lb. pork back fat



A close-up photo of a mortadella. Notice the fat cubes that make this sausage so distinctive.

GRINDING & COOKING

Separate meat from fat. Grind the chilled meat through a 1/2" grinding plate. Grinding the chilled pork back fat separately. Keep separated and place in refrigerator. With the exception of the garlic and pepper, all the spices are boiled in the wine for 15-20 minutes. Place meat in the mixing tub, and add the wine and spices after they have cooled. Dissolve all the gelatin and cure in luke warm water, let cool slightly adding it to the meat with the rest of the ingredients. Mix well. Grind all the meat through a 3/16" plate, add the ground course chilled pork fat into the meat and mix thoroughly. Stuff into beef bladders, or a large cellulose casing. Place overnight in 38-40° F cooler.

Place into a smoker preheated to 120° F, gradually increasing the temperature to 170° F in an 8-hour period. Keep at this temperature until the internal temperature reaches 155° F. If necessary, you may rinse with very hot water to remove the grease before placing under a cool shower. Reduce internal temperature to around 120-125° F before placing into 40-45° F cooler overnight.

BERLINER SAUSAGE

INGREDIENTS FOR 25 LBS.

5 tsp. Instacure No. 1
3/4 cup powdered dextrose
2-1/2 cups soy protein
concentrate or non-fat dry milk
2/3 cup salt
3 fresh onions
1 Tb. granulated garlic
2-1/2 Tb. ground white pepper
5 cups ice water
15 lbs. lean pork
5 lbs. boneless chuck
5 lbs. boneless veal

INGREDIENTS FOR 10 LBS.

2 tsp. Instacure No. 1
4 1/2 Tb. powdered dextrose
1 cup soy protein
concentrate or non-fat dry milk
4 Tb. salt
1 small onion
1 tsp. granulated garlic
1 Tb. ground white pepper
2 cups ice water
6 lbs. lean pork
2 lbs. boneless chuck
2 lbs. boneless veal

GRINDING & STUFFING

Grind all meat through 3/16" or 1/4" grinder plate and mix with all ingredients. Stuff meat into 5" fibrous casings and place in cooler for 2 days. Remove meat and keep at room temperature for 3 hours or until internal temperature of product reaches at least 60° F. Put in a preheated smokehouse at 120° F the first hour, and apply smoke while increasing temperature every 30 minutes by 10° F until 160° F is reached. Hold at this temperature until you reach 152° F and desired color is obtained. Cold shower until internal temp reaches 100° F. Place sausage on dowels, let bloom 2 hrs at room temperature. Place in cooler overnight, before using.

KOSHER STYLE SALAMI

INGREDIENTS FOR

25 LBS.

2/3 cup salt
2/3 cup powdered dextrose
5 tsp. Instacure No. 1
5 Tb. ground black pepper
2-1/2 Tb. paprika
2-1/2 Tb. ground ginger
5 tsp ground nutmeg
1-1/2 tsp. garlic powder
1 cup corn syrup solids
25 lbs. lean beef

INGREDIENTS FOR

10 LBS.

4 Tb. salt
4 Tb. powdered dextrose
2 level tsp. Instacure No. 1
2 Tb. ground black pepper
1 Tb. paprika
1 Tb. ground ginger
2 tsp. ground nutmeg
1/2 tsp. garlic powder
6 Tb. corn syrup solids
10 lbs. lean beef

GRINDING

Grind the fat meat through a 3/16" grinder plate and the lean beef through a 3/4" plate, or, you may dice into 1" pieces. Place all the meat into the mixer, adding all the ingredients. Mix well and place in 38- 40° F cooler overnight to allow meats to set up. The next day, regrind through 3/16" plate.

STUFFING

Be sure you pack the stuffer very tightly with the meat to eliminate all air pockets. Stuff into fibrous casing, 31/2" x 24". Hang salami on smokehouse sticks and place into smoker.

SMOKING

Smoker should be preheated to 130° F and salami should be kept in smoker for at least 1 hour with dampers wide open, no smoke. After this period, allow the dampers to remain about 1/4 open and apply heavy smoke, increasing the temperature to 140° F, and maintain for another hour. Raise the temperature to 160° F for 1 hour and then raise to 170° F, cutting off the smoke.

Keep salami in smoker until the internal temperature reaches 152° F. Remove from smoker and shower with cold

tap water until internal temperature is reduced to 110° F. Allow to hang at room temperature until the salami is dry or until desired bloom is obtained. Keep salami out of drafts while drying. Place in cooler overnight before using.

KRAKOWSKA

INGREDIENTS FOR 25 LBS.

2-1/2 cups ice water
3/4 cup salt
5 tsp. Instacure No. 1
5 Tb. powdered dextrose
5 Tb. garlic powder
2.5 tsp. ground white pepper
1 Tb. coriander
5 Tb. ground mustard
1 tsp. marjoram
25 lbs. boneless fresh hams

INGREDIENTS FOR 10 LBS.

1 cup ice water
5 Tb. salt
2 tsp. Instacure No. 1
2 Tb. powdered dextrose
2 Tb. garlic powder
1 tsp. ground white pepper
1 tsp. coriander
2 Tb. ground mustard
1/2 tsp. marjoram
10 lbs. boneless fresh hams

Krakowska, or KK as it is sometimes called, is made of fresh legs or what is commonly known as fresh hams. The hams are boned and the lean meat is kept separate. The hams are made as lean as possible and ground through a 1-1/2" grinder plate or cut up into 1 to 1-1/2" chunks. The trimmings from these hams can be used in this sausage if you can grind them very fine. In most cases, it is best to use the lean meat, as it makes a much nicer sausage. You may add up to 20% lean pork butts or pork shanks if available.

MIXING

Place meats in the mixing tub and add all the ingredients. Mix well until all the spices are evenly distributed. Stuff into fibrous casings 2 to 3-1/2" in diameter by 24" long. Place into cooler overnight.

SMOKING & COOKING

Place in a preheated smokehouse at 130° F with dampers wide open for 1 hour. Apply a heavy smoke, gradually increasing the smoker temperature to 160-165° F with dampers 1/4 open. Keep sausage in smoker until you reach the desired color or until sausage reaches 152° F internally. If you are using a steam cabinet, you may remove the krakowska from the smoker when the internal temperature is 130° F. Cook in

steam cabinet until internal temperature of 152° F is obtained.

When sausage is cooked, place under cool water shower until the internal temperature is reduced to 110° F. You may leave at room temperature for 45 minutes or until desired bloom is obtained. Remove to cooler and hold overnight.

BRAUNSCHWEIGER

INGREDIENTS FOR

25 LBS.

5 tsp. Instacure No. 1
3/4 cup salt
3/4 cup granulated onion
1 tsp. ground allspice
2.5 Tb. ground white pepper
5 Tb. powdered dextrose
1 tsp. marjoram
1.5 tsp. ground nutmeg
1.5 tsp. ground ginger
1.5 tsp. ground sage
1.5 tsp. ground cloves
2.5 Tb. ground mustard
5 cups ice water
11-1/4 lbs. pork snouts
13-3/4 lbs. pork livers
2.5 cups soy protein

INGREDIENTS FOR

10 LBS.

2 tsp. Instacure No. 1
5 Tb. salt
5 Tb. granulated onion
1/4 tsp. ground allspice
1 Tb. ground white pepper
2 Tb. powdered dextrose
1/4 tsp. marjoram
1/2 tsp. ground nutmeg
1/2 tsp. ground ginger
1/2 tsp. ground sage
1/2 tsp. ground cloves
1 Tb. ground mustard
2 cups ice water
4-1/2 lbs. pork snouts
5-1/2 lbs. pork livers
1 cup soy protein

GRINDING

Grind all meats through 3/16" grinder plate. Add other ingredients to the meat and mix well. After mixing, run through grinder again using 3/16" plate. Stuff immediately into 2 3/4" to 3" regular or sewed hog bungs.

COOKING AND SMOKING

Have water ready in the cooking tank at 180° F, then carefully place the braunschweiger in the tank. Be sure the braunschweiger is fully submerged. The water temperature should drop to about 160° F. Maintain that temperature until the internal temperature of the braunschweiger reaches 152° F. This should take from 2-2 1/2 hours.

After cooking, braunschweiger should be removed and placed in a container full of ice and water. Add additional ice to chill the braunschweiger as soon as possible. Chilling will take from 1-2 hours. Remove the braunschweiger and hang on smokesticks; shower with 180° F water for about 30 seconds to remove all the surface grease from the casing.

Hang at room temperature for 1 hour or until dry. Place in preheated smokehouse at 115-120° F. Hold at this temperature for about 3 hours. Apply a heavy smudge or until the desired color is obtained. Place in 35° F cooler overnight, for use the next day.

CHINESE-STYLE SAUSAGE

INGREDIENTS FOR

25 LBS.

2 cups powdered dextrose
5 cups soya sauce
5 cups Chinese white wine
5 tsp. Instacure No. 1
3-3/4 cups soy protein
concentrate
2/3 cup corn syrup solids
3/4 cup salt
17 lbs. very lean pork
8 lbs. backfat

INGREDIENTS FOR

10 LBS. (4.5 kg)

3/4 cup powdered dextrose
2 cups soya sauce
2 cups Chinese white wine
2 tsp. Instacure No. 1
1-1/2 cup soy protein
concentrate
4 Tb. corn syrup solids
6 Tb. salt
6-1/2 lbs. very lean pork
3-1/2 lbs. backfat

GRINDING & COOKING

Cut the backfat into cubes 1/4" to 1/2"; place cubes into hot boiling water for a few seconds using a sieve or a screen. This prevents the cubes from sticking together. This is done just before adding the rest of the ingredients. Be sure you allow it to cool properly.

The lean pork also is cut up in cubes 1/4" to 1/2"; mix all ingredients with the pork, except the soy protein concentrate. Let stand for about 5 minutes. Then add backfat and soy protein concentrate and mix well. Let stand another 5 minutes before placing into stuffer. Use a 38-42mm hog casing for stuffing into 5" or 6" links. The casings will have to be pin-pricked to insure proper drying. Place in smokehouse without smoke and let dry for 5-6 hours at 120° F or until desired color is obtained. Remove to cooler overnight.

NOTE:

The USDA regulations class Chinese sausage in the uncooked variety. It therefore is necessary to use certified frozen pork or see page 40 for destroying trichinae.

COOKED SALAMI

INGREDIENTS FOR 25 LBS.

5 cups ice water
2/3 cup salt
1 cup corn syrup solids
5 Tb. ground black pepper
5 tp. Instacure No. 1
2.5 Tb. whole black pepper
5 Tb. cardamon
10 cloves of garlic
5 cups soy protein concentrate
16 lbs. very lean beef
9 lbs. very lean pork butts

INGREDIENTS FOR 10 LBS.

2 cups ice water
4 Tb. salt
6 Tb. corn syrup solids
2 Tb. ground black pepper
2 tsp. Instacure No. 1
1 Tb. whole black pepper
2 Tb. cardamon
4 large cloves fresh garlic
2 cup soy protein concentrate
6 1/2 lbs. very lean beef
3 1/2 lbs. very lean pork butts

GRINDING & STUFFING

Grind the beef and pork through a 3/16" grinder plate; add ingredients and mix well. Place meat into a stuffer pressing down to remove air pockets as it is being packed into stuffer. Stuff into 3 1/2"x24" synthetic-fibrous casing. Place into 38 to 40° F cooler overnight.

SMOKING & COOKING

Salami is to be removed and placed in a preheated smokehouse at 130-135° F for 1 hour. After 1 hour, you may apply a light or medium smoke. Gradually increase smokehouse temperature to 150° F during the next 30 minutes and hold at this temperature until a desired color is obtained. This will take from 4-5 hours. You may then cut off all the smoke and raise the smoker temperature to 165-170° F and cook until the internal temperature is 155° F.

Remove salami from smoker and shower with cool water until an internal temperature of 120° F is obtained. Allow the salami to hang at room temperature for 30 minutes to 1 hour or until a desired bloom is obtained.

COTTO SALAMI

INGREDIENTS FOR 10 LBS.

Use the cooked Salami recipes with the following changes:

Delete the 2 Tb. Cardamon

Add:

1/2 tsp. nutmeg

1/2 tsp. allspice

1/2 tsp. ginger

1 Tb. caraway seed

BRAUNSCHWEIGER LIVER SAUSAGE

INGREDIENTS FOR 25 LBS.

5 cups non-fat dry milk
or soy protein concentrate
3/4 cup salt
5 Tb. onion powder
5 Tb. powdered dextrose
5 tsp. Instacure No. 1
2.5 Tb. ground white pepper
1.5 tsp. ground cloves
1.5 tsp. ground allspice
1.5 tsp. rubbed sage
1.5 tsp. ground marjoram
1.5 tsp. ground nutmeg
1.5 tsp. ground ginger
12 1/2 lbs. pork liver
12 1/2 lbs. pork snouts

INGREDIENTS FOR 10 LBS.

2 cups non-fat dry milk
or soy protein concentrate
5 Tb. salt
2 Tb. onion powder
2 Tb. powdered dextrose
2 tsp. Instacure No. 1
1 Tb. ground white pepper
1/2 tsp. ground cloves
1/2 tsp. ground allspice
1/2 tsp. rubbed sage
1/2 tsp. ground marjoram
1/2 tsp. ground nutmeg
1/2 tsp. ground ginger
5 lbs. pork liver
5 lbs. pork snouts

GRINDING

Be sure all the meat used has been chilled at 32-34° F. All meat is to be ground through a 3/16" grinder plate several times. Place in mixer and add all the ingredients. Stuff into 2 3/4" to 3"x30" sewed hog bungs. You may also use a fibrous casing if you wish.

SMOKING & COOKING

After stuffing, place braunschweiger into cooker with water preheated to 180°. Water temperature will drop to 160-165° F and continue cooking until the internal temperature reaches 152° F internally. After cooking, place sausage into a container filled with ice and water and cool as rapidly as possible for 1-2 hours.

Remove from water and hang on sticks. You may shower braunschweiger with hot water for about 30 seconds to

remove surface grease. Hang at room temperature for about 1 hour or until dry. Remove to preheated smoker at 115-120° F. Apply a heavy smoke at this temperature for approximately 3 hours or until the desired color is obtained. After smoking, you may shower with cool water for about 5 minutes. Let dry and remove to cooler overnight.

METTWURST

INGREDIENTS FOR 25 LBS.

5 tsp. Instacure No. 1
5 Tb. nutmeg, ground
2.5 Tb. grd. white pepper
2.5 tsp. grd. celery
2.5 Tb. grd. allspice
2.5 tsp. marjoram
1.5 tsp. grd. caraway seed
2.5 tsp. grd. coriander
2/3 cup powdered dextrose
5 tsp. whole mustard seed
(optional)
3/4 cup salt

INGREDIENTS FOR 10. LBS.

2 tsp. Instacure No. 1
2 Tb. nutmeg, ground
1 Tb. grd. white pepper
1 tsp. grd. celery
1 Tb. grd. allspice
1 tsp. grd. marjoram
1/2 tsp. grd. caraway seed
1 tsp. grd. coriander
4 Tb. powdered dextrose
2 tsp. whole mustard seed
(optional)
5 Tb. salt

A very good mettwurst is made using 3 kinds of meats: 20% veal, 50% pork buffs and 30% beef chuck, or in a 10 lb. recipe, 2 lbs. of veal, 5 lbs. of pork butts, and 3 lbs. of beef chuck.

GRINDING & CHOPPING

Grind all the meats through 1/2" grinder plate and place meats in the mixing tub. Add all the ingredients and mix until evenly distributed. Remove from tub and regrind through 3/16" plate. Stuff into beef rounds that have been washed and cut into pieces 16-18" length and tied at one end. Tie ends together and hang properly on smokestick. Prick the casings, allowing air that might be trapped into stuffing to escape. Remove to cooler and cure 24 hours at 40° F.

SMOKING

Place in 90-100° F smokehouse with heavy smudge for 8-12 hours. Remove from smokehouse and dip or spray with hot water to plump the casings. Allow to chill down to room temperature 60-65° F before placing in the cooler. Allow to hang overnight in the cooler.

NOTE:

The USDA regulations class "mettwurst" as a summer sausage of the uncooked variety. It therefore is necessary to use certified frozen pork to manufacture this product. The outlined above procedure does not conform to government regulations concerning the destruction of live trichinae. See page 40 for destroying trichinae.

FISH SAUSAGE

INGREDIENTS FOR 10 LBS.

2 cups ice water
1 lb. vegetable shortening
1.5 cups corn starch
4 Tb. salt
1 tsp. sugar
1 Tb. ground black pepper
1 tsp. onion powder
1 tsp. garlic powder
1 tsp. ground nutmeg

After the fish are deboned, be sure the flesh is cooled to at least 35° F before starting. The fish is then ground through a 3/16" grinder plate. The salt is then added and mixed thoroughly. This will allow the sausage to bind well. After 10 minutes add the corn starch mixed with the ice water. The spices and shortening are added last, again mix thoroughly. The mixture is then stuffed into a fibrous casing of your choice 2" or 3 1/2" wide.

The sausage is then cooked in water 200-205° F until the internal temperature reaches 180° F. The sausage is then promptly cooled in cold water or showered until the internal temperature of 70° F is obtained. The cooled sausage is then immersed in boiling water for one minute in order to tighten the casing.

Fish sausage is a very perishable product and should be stored at a temperature of at least 35° F. It also keeps well when frozen.

Because this sausage is cooked at such high temperatures, the use of cures is not required. Also, this sausage may also be made in a loaf for home use and cooked in a loaf pan. If allowed to cool overnight it will slice very nicely as any other lunchmeat.

This loaf may also be flavored with liquid smoke, using 1 teaspoon to each 5 lbs. of meat.

GERMAN BOLOGNA

INGREDIENTS FOR 25 LBS.

18 lbs. lean beef
7 lbs. pork butts
2.5 tsp. ground white pepper
1/2 cup ground mustard
2.5 Tb. ground celery
2.5 tsp. ground nutmeg
2.5 tsp. ground coriander
2.5 tsp. garlic powder
3/4 cup powdered dextrose
5 cups soy protein
concentrate
5 cups ice water
5 tsp. Instacure No. 1
2/3 cup salt

INGREDIENTS FOR 10 LBS.

7 lbs. lean beef
3 lbs. pork butts
1 tsp. ground white pepper
3 Tb. ground mustard
1 Tb. ground celery
1 tsp. level ground nutmeg
1 tsp. ground coriander
1 tsp. garlic powder
4.5 Tb. powdered dextrose
2 cups soy protein
concentrate
2 cups ice water
2 level tsp. Instacure No. 1
4 Tb. salt

Chuck meat may be used as lean beef called for in the above formula, along with the pork butts. All meat is ground through a 3/16" grinder plate. Ingredients then are mixed and distributed evenly, adding water as you go along. Bologna is usually stuffed into 8" diameter casings; however, for home use you can use 3-1/2", 5", or any size that is handy. Allow bologna to hang at room temperature until casings are dry. Then place in a preheated smokehouse at 165° F until the internal temperature reaches 150° F. Bologna is removed and quickly cooled with water until internal temperature is reduced to around 90° F. This type of bologna usually isn't smoked and is a coarse-type sausage.

Should you like a smoother texture, follow the emulsified sausage instructions on page 200.

LIVER AND ONION SAUSAGE

INGREDIENTS FOR

25 LBS.

15 lbs. pork liver
*7-1/2 lbs. pork butts
3.75 cups finely chopped onions
2-1/2 cups soy protein
concentrate
5 Tb. powdered dextrose
2-1/2 Tb. ground white pepper
2-1/2 tsp. ground marjoram
2-1/2 tsp. ground cloves
2-1/2 tsp. ground ginger
5 tsp. Instacure No. 1
2/3 cup salt
5 cups ice water

INGREDIENTS FOR

10 LBS.

7 lbs. pork liver
*2-1/4 lbs. pork butts
1.5 cups finely chopped onions
1 cup soy protein
concentrate
2 Tb. powdered dextrose
1 Tb. ground white pepper
1 tsp. ground marjoram
1 tsp. ground cloves
1 tsp. ground ginger
2 level tsp. Instacure No. 1
4 Tb. salt
2 cups ice water

*Whenever possible use lean pork snouts in place of pork butts.

Cut pork livers into slices about 1/2" to 3/4" thick. Place liver into boiling water until it is cooked. Cool the liver in cold water and grind through a 3/16" grinder plate. Pork butts (or snouts) are then ground through a 3/8" grinder plate. Remaining ingredients are added and mixed until evenly distributed. Then stuff meat into 40-43mm beef middles.

Place sausage in 160° F water and cook until an internal temperature of 152° F is reached. Remove to cooler and allow to set for 24 hours before using.

POLISH HAM SAUSAGE

(Kielbasa Szynekowa)

INGREDIENTS FOR 25 LBS.

25 lbs. very lean pork
or ham
2/3 cup salt
5 tsp. Instacure No. 1
5 Tb. powdered dextrose
2-1/2 Tb. ground black pepper
2-1/2 Tb. ground coriander
2-1/2 Tb. ground nutmeg
5 cups ice water

INGREDIENTS FOR 10 LBS.

10 lbs. very lean pork
or ham
4 Tb. salt
2 tsp. Instacure No. 1
2 Tb. powdered dextrose
1 Tb. ground black pepper
1 Tb. ground coriander
1 Tb. ground nutmeg
2 cups ice water

Cut lean meat into 1" cubes or grind through a 3/4" grinder plate. Grind the fat meat through a 3/16" grinder plate. Add the remaining ingredients to the meat and mix thoroughly. Stuff the mixture into clear, fibrous 3-1/2" x 24" casings and dry at room temperature for 2 hours (at the same time, the temperature of the meat will be rising slowly). Place the sausage in a smokehouse preheated to 150° F for 1 hour, applying dense smoke. Then increase the temperature to 165° F and continue until an internal temperature of 152° F is reached. Smoke the sausage for 3 more hours, reducing the smokehouse temperature to 150° F. Place in cooler overnight before using.

KIELBASA SERDELOWA (Serdelki)

INGREDIENTS FOR

25 LBS.

20 lbs. calf meat or veal
5 lbs. fresh bacon
2/3 cup salt
5 tsp. Instacure No. 1
2-1/2 Tb. ground paprika
2-1/2 Tb. ground black pepper
2-1/2 Tb. garlic
2-1/2 cups non-fat dry milk
8 cups ice water
5 Tb. powdered dextrose

INGREDIENTS FOR

10 LBS.

8 lbs. calf meat or veal
2 lbs. fresh bacon
4 Tb. salt
2 level tp. Instacure No. 1
1 Tb. ground paprika
1 Tb. ground black pepper
1 Tb. garlic
1 cup non-fat dry milk
3 cups ice water
2 Tb. powdered dextrose

Grind meat through 3/16" grinder plate. Add remaining ingredients and mix well until evenly distributed. Stuff mixture into 24-26mm sheep casings and allow to hang at room temperature until dry. Then place sausage in a smokehouse preheated to 120° F, applying a dense smoke. After one hour, increase the temperature to 165° F and continue until the internal temperature of the sausage reaches 152° F. Remove sausage from smoker and quickly shower with cold water until the internal temperature is reduced to 90° F. Hang the sausage at room temperature for one hour before placing in a cooler overnight.

POLISH LEMON SAUSAGE

(Kielbasa Cytrynowa)

INGREDIENTS FOR

25 LBS.

20 lbs. pork butts
5 lbs. lean beef
2/3 cup salt
5 tsp. Instacure No. 1
2-1/2 Tb. ground black pepper
2-1/2 tsp. ground nutmeg
1/2 cup powdered dextrose
1-1/2 Tb. finely
 chopped lemon rind
5 cups ice water

INGREDIENTS FOR

10 LBS.

8-3/4 lbs. pork butts
1-1/4 lbs. lean beef
4 Tb. salt
2 level tsp. Instacure No. 1
1 Tb. ground black pepper
1 tsp. ground nutmeg
3 Tb. powdered dextrose
1 slice finely
 chopped lemon rind
2 cups ice water

Grind meat through a 3/16" grinder plate. Add remaining ingredients and mix well, adding water as you go along. Stuff sausage in clear, fibrous 3-1/2" x 24" casings. Place the sausage on smokesticks and hang at room temperature 65-70° F for about 2 hours.

Then put sausage into a smokehouse preheated to 150° F. Apply smoke. After one hour, increase the temperature to 160° F and keep the sausage there until an internal temperature of 152° F is reached. The sausage will have a nice brown color when completed and the finished weight will be about 95% of the original.

KIELBASA KRAKOWSKA

INGREDIENTS FOR

25 LBS.

12-1/2 lbs. lean fresh ham
7-1/2 lbs. pork butts
5 lbs. veal
2/3 cup salt
5 tsp. Instacure No. 1
2-1/2 Tb. ground black pepper
2-1/2 Tb. garlic
1-1/2 tsp. cardamon
1/2 cup powdered dextrose
5 cups ice water

INGREDIENTS FOR

10 LBS.

5 lbs. lean fresh ham
3 lbs. pork butts
2 lbs. veal
4 Tb. salt
2 level tsp. Instacure No. 1
1 Tb. ground black pepper
1 Tb. clove garlic
1/2 tsp. cardamon
2 Tb. powdered dextrose
2 cups ice water

Trim fat from meat and grind through a 3/16" grinder plate. Grind lean meat through a 3/4" grinder plate. Add the remaining ingredients to the combined meat mixture and mix until evenly distributed. Regrind meat through a 3/8" grinding plate stuff into 35x38 mm hog casing, prick out any air pockets. Place in 38-40° F cooler overnight.

SMOKING

Place the sausage on smokesticks and dry at room temperature for about 30-40 minutes. Place sausage in a smokehouse preheated to 130° F or about 45 minutes with damper and draft wide open. When the sausage starts to take on a brown color, close damper to 1/4 open and adjust draft to an almost-closed position. Increase the temperature to 160° F and maintain until an internal temperature of 152° F is reached. Remove the sausage from the smoker and quickly shower with cool water until the internal temperature is reduced to 100° F. Place in cooler overnight before using.

RHEINISCHE FLEISCHWURST (Rhineland Ham Sausage)

INGREDIENTS FOR

25 LBS.

13-1/2 lbs. pork butts
7-1/2 lbs. leg of pork
(fresh ham)
4 lbs. smoked bacon
5 Tb. granulated onion
2/3 cup salt
5 tsp. Instacure No. 1
2-1/2 Tb. ground white pepper
2-1/2 tsp. ground cloves
2-1/2 Tb. ground nutmeg

INGREDIENTS FOR

10 LBS.

5 lbs. pork butts
3 lbs. leg of pork
(fresh ham)
2 lbs. smoked bacon
2 Tb. granulated onion
4 Tb. salt
2 tsp. Instacure No. 1
1 Tb. ground white pepper
1 tsp. ground cloves
1 Tb. ground nutmeg

The meat should be chilled to 38-40° F before starting. Grind the pork legs and butts through a 3/4" grinder plate. Cut the smoked bacon into 1/4" - 1/2" cubes. Mix the meat with the remaining ingredients, blending thoroughly. Stuff it into beef middles about 4-4 1/2" in diameter or use a 5" fibrous casing. After stuffing, let the casings dry and place the sausage in the smoker for further drying at about 120° F. When the casings are dry, increase the temperature to 160-165° F and keep there until an internal temperature of 152° F is reached. Remove from the smoker and shower with cold water until the internal temperature is reduced to 120° F.

A sausage made with a large-size casing (5-8") can easily take up to 10 or 12 hours before you can reach the 152° F temperature required. To speed this process, you can cook the sausage in water at 160° F until the 152° F temperature is reached. In other words-after you have achieved a desirable color in the smoker, the process can be completed by cooking in water.

SULZWURST EINFACH

INGREDIENTS FOR

25 LBS.

12-1/2 lbs. pig skins
6-1/4 lbs. pig hearts
6-1/4 lbs. pig meat
from head or feet
2-1/2 Tb. ground white pepper
1/2 cup chopped pimentos
2-1/2 Tb. ground caraway seeds
3 cups finely ground raw onions
2-1/2 cups gelatin

INGREDIENTS FOR

10 LBS.

6 lbs. pig skins
2 lbs. pig hearts
2 lbs. pig meat from
head or feet
1 Tb. ground white pepper
3 Tb. chopped pimentos
1 Tb. ground caraway seed
1-1/4 cup finely ground raw onions
1 cup gelatin

The meat has to be cured in a brine for 3 days using the following ingredients:

2-1/2 gallons ice water
2-1/2 lbs. salt
1-1/4 cups powdered dextrose
1/2 cup Instacure No. 1

After curing the meat, place it in a kettle or container and cook for 1-1/2-2 hours. The pork skins should be kept in a cooking net or cooked separately because they are to be ground more finely than the other meat. Cool all the meat and broth, then grind the pork skins through a 3/16" grinder plate. After grinding, mix all the meat with the remaining ingredients, adding 10% of the broth. Allow this mixture to cook until a 160° F temperature is reached (do not overcook; the binding power of the gelatin will be broken down when you reach 170° F). Allow to cool, then stuff the mixture into 5" fibrous casings. After the sausage is stuffed, it should be cooled for at least 24 hours before using. You also may use any type of deep cake pan to mold these ingredients.

JAGDWURST

(Hunters Sausage)

INGREDIENTS FOR 25 LBS.

6-1/4 lbs. lean fresh ham
8-3/4 lbs. fresh bacon
10 lbs. lean pork butts
2/3 cup salt
5 tsp. Instacure No. 1
4 Tb. powdered dextrose
2-1/2 Tb. ground white pepper
2-1/2 Tb. ground coriander
2-1/2 Tb. fresh garlic
5 Tb. ground mustard seed
2-1/2 Tb. ground nutmeg
2-1/2 Tb. ground ginger

INGREDIENTS FOR 10 LBS.

1-1/2 lbs. lean fresh ham
4 lbs. fresh bacon
4-1/2 lbs. lean pork butts
4 Tb. salt
2 level tsp. Instacure No. 1
1-1/2 Tb. powdered dextrose
1 Tb. ground white pepper
1 Tb. ground coriander
1 Tb. garlic
2 Tb. ground mustard seed
1 Tb. ground nutmeg
1 Tb. ground ginger

Trim the fat from the fresh ham and grind with the lean pork butts through a 3/16" grinder plate. Grind fresh bacon and lean ham through a 3/8" grinder plate. Garlic is usually chopped in a blender with a little water to help it along. Add the remaining ingredients and mix thoroughly. Stuff the meat into a clear, fibrous 3-1/2" x 24" casing. Allow to dry at room temperature for 30-40 minutes. Then place the sausage in a smoker pre-heated to 130° F for about 1 hour without smoke. Increase the smokehouse temperature to 165° F and maintain until the internal temperature of the sausage reaches 150° F.

Do not smoke the sausage for more than 30 minutes during this period.

Jagdwurst is a mild-tasting sausage but somewhat spicy. This is why the smoke is applied for such a short period. The meat, spices, garlic and smoke are being blended into one flavor.

TEEWURST (Teawurst)

Teewurst is a finely ground sausage that easily spreads on a piece of bread when properly made. There are a number of things one must do to develop the special flavor of this sausage. The beef and pork that are used should be from older animals whenever possible. In addition, it is preferable to smoke this sausage with a mixture of oak, beech and juniper berries. The finished product will have a reddish-brown color.

INGREDIENTS FOR 25 LBS.

5 lbs. lean beef
7-1/2 lbs. fresh bacon
12-1/2 lbs. lean pork butts
2/3 cup salt
5 tsp. Instacure No. 1
5 Tb. powdered dextrose
2-1/2 Tb. ground white pepper
2-1/2 tsp. pimentos, chopped
1-1/2 tsp. cardamon
1/2 cup good rum
2-1/2 tsp. red cayenne pepper

INGREDIENTS FOR 10 LBS.

2-1/2 lbs. lean beef
3 lbs. fresh bacon
5 lbs. lean pork butts
4 Tb. salt
2 tsp. instacure No. 1
1-1/2 Tb. powdered dextrose
1 Tb. ground white pepper
1 tsp. pimentos, chopped
1/2 tsp. cardamon
3 Tb. good rum
1 tsp. red cayenne pepper

Grind meat and pimentos through a 3/16" grinder plate. Add remaining ingredients and mix well until evenly distributed. Regrind meat through a 3/16" grinder plate so you can achieve a finer texture for spreading. Stuff meat into a clear fibrous casing 3-1/2" x 24" in diameter. After stuffing, hang the sausage at 68-70° F for at least 3 hours. Place sausage in a cold smoker with heavy, dense smoke for 2-3 days. You may also smoke it for 8-10 hours at 90-100° in dense smoke, but you will get a better flavor if it is smoked for 2-3 days without heat.

Teewurst is a fine quality sausage and does not spoil quickly if kept refrigerated. It is a type of sausage one must acquire a taste for.

IMPORTANT:

Because the above processing procedure does not conform to the U.S.D.A. regulations concerning the destruction of live trichinae sometimes found in pork, be sure that you are using certified pork, or a pork that has been properly frozen, using the following instructions. See page 40 for destroying trichinae.

WEISSWURST

INGREDIENTS FOR

25 LBS.

12-1/2 lbs. veal
12-1/2 lbs. lean pork butts
1-1/4 cups non-fat dry milk
2/3 cup salt
1-1/4 cups soy protein
concentrate
2-1/2 tsp. onion powder
2-1/2 tsp. dry parsley
2/3 cup ground mustard seed
2-1/2 Tbs. ground white pepper
2-1/2 tsp. ground celery seeds
2-1/2 tsp. mace
1/2 cup powdered dextrose
10 cups ice water

INGREDIENTS FOR

10 LBS.

5 lbs. veal
5 lbs. lean pork butts
1/2 cup non-fat dry milk
4 Tb. salt
1/2 cup soy protein
concentrate
1 tsp. onion powder
1 tsp. dry parsley
4 Tb. ground mustard seed
1 Tb. ground white pepper
1 tsp. ground celery seeds
1 tsp. mace
3 Tb. powdered dextrose
4 cups ice water

Grind meat through a 1/4" or 3/8" grinder plate. Add all the ingredients except the water and mix thoroughly until evenly distributed. Then place the meat in the food processor, adding water as you go, to help emulsify the meat.

Stuff into a 32-35mm hog casing and make into 5" to 6" links. Place into 160° F water and cook until an internal temperature of 150° F is attained. Then shower the sausage with cool water until the internal temperature falls to 75° F. Place in cooler overnight before using.

SMOKED HUNGARIAN PAPRIKA SAUSAGE

INGREDIENTS FOR

25 LBS.

25 lbs. pork butts
2/3 cup salt
1/2 cup powdered dextrose
5 tsp. Instacure No. 1
2-1/2 Tb. garlic
2-1/2 Tb. ground black pepper
1 cup paprika
5 cups ice water

INGREDIENTS FOR

10 LBS.

10 lbs. pork butts
4 Tb. salt
3 Tb. powdered dextrose
2 tsp. Instacure No. 1
1 Tb. garlic clove
1 Tb. ground black pepper
6 Tb. paprika
2 cups ice water

Grind pork butts through a 3/8" grinder plate and the fat meat through a 1/8" grinder plate. Add other ingredients and mix thoroughly until evenly distributed. Then stuff sausage into a 35-38mm hog casing and allow it to dry at room temperature for about 1 hour. Place sausage in a preheated smokehouse at 130° F with the vents wide open until the sausage starts to take on a brown color. At this point close damper to 1/4 open. Gradually increase temperature at the rate of 10° F per hour until 160° F is attained. Sausage is then smoked at this temperature until an internal temperature of 150° F is obtained. Remove from smoker and shower with cool water until internal temperature is reduced to 90° F.

The heavy use of paprika in this formula will leave your sausage with a deep reddish-brown color when it is finished.

TURKEY SAUSAGE

INGREDIENTS FOR

25 LBS.

20 lbs. turkey
5 lbs. fat pork butts
2/3 cup salt
5 tsp. Instacure No. 1
1/2 cup powdered dextrose
2-1/2 cups soy protein concentrate
10 cups ice water

INGREDIENTS FOR

10 LBS.

7-1/2 lbs. turkey
2-1/2 lbs. fat pork butts
4 Tb. salt
2 tsp. Instacure No. 1
3 Tb. powdered dextrose
1 cup soy protein concentrate
4 cups ice water

Grind meat through a 3/16" or 1/4" grinder plate. Add all ingredients except water and mix thoroughly. Place the meat in a food processor, adding some of the water as you go along to help emulsify the meat.

The mixture is then stuffed into 32-35mm hog casings and linked into 5"-6" pieces. Allow the sausage to dry at room temperature while you preheat the smoker to 130° F. Keep sausage at this temperature for an hour. Increase temperature to 150° F and hold for one more hour, applying the smoke.

The temperature is then raised to 165° F and maintained until an internal temperature of 160° F is reached. Remove it from the smokehouse and shower it with cool water for 20 minutes. Place sausage in cooler and store overnight before using.

TURKEY OR POULTRY ROLL

Turkey and chicken have distinct flavors and only salt is needed to give additional flavor. The poultry skins are cooked in salted water along with the fat removed from the bird. This broth is then cooled to around 34-36° F.

INGREDIENTS FOR

25 LBS.

2 lbs. poultry fat
15 lbs. poultry meat
5 cups broth
5 cups flour (semolina)
3/4 cup salt
5 tsp. Instacure No. 1

INGREDIENTS FOR

10 LBS.

1 lb. poultry fat
7 lbs. poultry meat
2 cups broth
2 cups flour (semolina)
5 Tb. salt
2 tsp. Instacure No. 1

All meats and fat are ground through 3/16" grinder plate. Dissolve salt and Instacure in broth. Add flour to meat and broth and mix well, stuff into 3-1/2" x 24" clear fibrous casings. Product is placed in a preheated smokehouse at 130° F and kept there for 1/2 hour with dampers wide open. A heavy smudge of smoke is then introduced, close damper to 1/4 open, raising the smokehouse temperature to 150° F and maintaining for one hour.

Raise smokehouse temperature to 175° F and hold until internal temperature of product reaches 160° F. Product is then removed and showered with cold water until internal temperature is at 110° F before placing in cooler overnight. This product is highly perishable but keeps very well when frozen.

Semolina flour is used in making spaghetti. If not available in your area, you may substitute with regular flour.

COOKING MEAT

On the following pages you will find a number of recipes that call for the cooking of various kinds of meat before the sausage-making can actually begin. Some of these products are pork snouts, tongues and skins. In any case, it always is best to cook these meats first, then allow them to cool overnight in a cooler or refrigerator. The meat will set up and will be easier to cut or grind. It is not advisable to grind meat that has not been cooled overnight.

GOOSE LIVER SAUSAGE

INGREDIENTS FOR

25 LBS.

12 lbs. pork liver
*12 lbs. pork butts or pork snouts
1 lb. goose liver
2 cups soy protein concentrate
2/3 cup salt
5 tsp. Instacure No. 1
3/4 cup powdered dextrose
4 Tb. onion powder
5 Tb. ground white pepper
2-1/2 tsp. sage
2-1/2 tsp. marjoram

INGREDIENTS FOR

10 LBS.

4-3/4 lbs. pork liver
*4-3/4 lbs. pork butts or pork snouts
1/2 lb. goose liver
3/4 cup soy protein concentrate
4 Tb. salt
2 level tsp. Instacure No. 1
5 Tb. powdered dextrose
1-1/2 Tb. onion powder
2 Tb. ground white pepper
1 tsp. sage
1 tsp. marjoram

**You should try to use pork snouts from a young hog, as they are very meaty. If not available, use pork butts instead.*

The pork livers should be cut into slices about 1/2" to 3/4" thick and placed in cold water for at least 1 hour, then drained. All goose livers should also be washed very well. Then put all the livers in boiling water until they are cooked. Allow livers to cool in cold water, then grind through a 3/16" grinder plate along with the pork snouts.

Remaining ingredients then are added to meat and mixed well until evenly distributed. Stuff mixture into a hog bung or a 3-1/2" x 24" fibrous casing. Place sausage in water at 160° F and leave it there until an internal temperature of 160° F is reached. Chill sausage with cold water until the internal tem-

perature drops to around 100-110° F. Place in cooler overnight.

The next day, place the sausage in a preheated smoker at 90° F and smoke for 3 hours.

SPECIAL NOTE:

The above recipe calls for smoking goose liver. However, I prefer a goose liver that is not smoked.

BOUDIN (Pronounced Boo-dan)

Boudin is best known in this country by the Cajuns of Louisiana. This is another form of blood sausage originating in France. In general, there are two kinds of boudin and they are very different in composition.

One is boudin blanc, a white sausage usually served during holiday meals. The white color tells us this sausage is made without blood. The more popular boudin is made with blood.

Various stories have circulated over the years concerning the origin of this sausage. One such story says that the French who were driven out of Nova Scotia in 1755 brought boudin with them when they then settled in Louisiana. Over the years boudin sausage has become very popular in some parts of the U.S., especially the south. In either case, there is no question the boudin sausage had its beginnings in France. Practically every area of France has its own boudin sausage, such as boudin auvergne, boudin de Nancy, boudin du Poitou, and boudin de Lyar.

The production of this sausage varies very little from one locale to another. The addition of plums, apples, onions, sugar or cinnamon may indicate what area it's from. Like other blood sausages, this sausage is eaten as a breakfast sausage or as a main course.

INGREDIENTS FOR 25 LBS.

7 lbs. fat pork meat
9 lbs. raw onions
9 lbs. beef blood
5 tsp. Instacure No. 1

INGREDIENTS FOR 10 LBS.

3 lbs. fat pork meat
3-1/2 lbs. raw onions
3-1/2 lbs. beef blood
2 level tsp. Instacure No. 1

This boudin sausage recipe calls for six different spices. A number of these spices are in very small amounts. It is best that a mixture of spices and salt be blended for a 100-lb. recipe and then weighed out as needed.

100-LB. INGREDIENT FORMULA

2 lbs. 1 oz. salt

18 Tb., = 4-1/2 ozs. coarse black pepper

2 Tb. = 1/2 oz. ground cloves

2 Tb. = 1/2 oz. ground marjoram

2 Tb. = 1/2 oz. ground cinnamon

4 Tb. = 1 oz. ground thyme

40 ozs. total

Ten ounces of the above ingredients is enough to season 25 lbs. of meat. For a 10-lb. recipe, you can use 4 ozs.

The raw onions should be chopped into small pieces and sauteed in lard until they are a golden brown. Allow onions to cool.

Grind pork through a 3/8" grinder plate and place in mixing container. (Be sure all the fat pork has been chilled to at least 38-40° F before grinding.) Add the cooled onions to the meat mixture along with the other ingredients, including the blood. Mix thoroughly, then stuff into 35-38mm hog casings. Then place sausage in water at 170-180° F until the internal temperature is at least 160° F. Allow to cool overnight before using.

CAJUN-STYLE BOUDIN

Cajun boudin is the same as any other French blood sausage. The many variations of this sausage are due to geographical considerations and an over abundance of certain ingredients in a particular area.

As rice is abundant in Louisiana and the surrounding area, it is the ingredient that makes this boudin so different than the boudin of France.

The recipe also calls for minced parsley and milk (either fresh or evaporated). The milk does tend to shorten the life of this sausage, since milk sours quickly. Freeze sausage that isn't used right away. The following ingredients can be added to a 10-lb. recipe on the preceding page.

5 ozs. seasoning (from previous page)
1 lb. rice (uncooked)
3 Tb. finely-minced parsley
4 cups milk

Cook rice according to package directions; allow to cool. Add remaining ingredients and mix thoroughly. Then stuff mixture into 40-43mm beef rounds and cook in water at 170-180° F until the internal temperature is 160° F.

NOTE:

Because the rice will swell, it is recommended that you add 5 ozs. of the ingredients from the previous formula rather than the 4 ozs. called for. The finished product will yield 12-13 lbs. of sausage.

POLSKA KISZKA WATROBIANA **(Polish Blood Sausage with Liver)**

INGREDIENTS FOR 25 LBS.

6-1/2 lbs. liver (pork or beef)
6-1/2 lbs. fresh bacon
12 lbs. any combination of
pigs feet, snouts or other meat
2/3 cup salt
1-1/2 cups chopped onions
2-1/2 tsp. marjoram
2-1/2 tsp. black table pepper
5 tsp. Instacure No. 1
5 cups blood (beef or pork)

INGREDIENTS FOR 10 LBS.

3 lbs. liver (pork or beef)
3 lbs. fresh bacon
4 lbs. any combination of
pigs feet, snouts or other meat
4 Tb. salt
2/3 cup chopped onion
1 Tsp. marjoram
1 Tsp. black table pepper
2 tsp. Instacure No. 1
2 cups blood (beef or pork)

All the pork (except the bacon and liver) must be cooked until tender. Allow to cool and remove the bones, if you are using pig's feet. Save the broth.

Grind the meat through a 3/16" grinder plate. Add remaining ingredients (except blood) and mix thoroughly until evenly distributed. Add the blood and mix thoroughly again. Stuff mixture into 35-38mm hog casings about 15" long, leaving 3-4" of empty casing on each end. Tie sausage into a ring. Place sausage in water at 170° F until an internal temperature of 160° F is reached. Then shower sausage with cold water until the internal temperature is reduced to 60-70° F. You may smoke this sausage for about 1 hour after it has dried, if you like.

NOTE:

You can substitute the broth in this recipe for the blood. There are many people who prefer to use the broth as it is less offensive to them than the blood.

FARMER-STYLE LIVER SAUSAGE

INGREDIENTS FOR

25 LBS.

5 tsp. Instacure No. 1
1 cup salt
2/3 cup powdered dextrose
5 cups soy protein concentrate
or non-fat dry milk
3/4 cup onion powder
2-1/2 Tb. ground white pepper
2-1/2 tsp. marjoram
1 tsp. ground cloves
1 tsp. ground ginger
8-1/2 lbs. pork livers
8-1/2 lbs. pork snouts
8 lbs. beef tripe

INGREDIENTS FOR

10 LBS

2 level tsp. Instacure No. 1
6 Tb. salt
4 Tb. powdered dextrose
2 cups soy protein concentrate
or non-fat dry milk
5 Tb. onion powder
1 Tb. ground white pepper
1 tsp. marjoram
1/4 tsp. ground cloves
1/4 tsp. ground ginger
3-1/2 lbs. pork livers
3-1/2 lbs. pork snouts
3 lbs. beef tripe

GRINDING

The pork livers have to be scalded in hot water until the thin ends curl up. The pork snouts should be cooked at least 1 hour. If the tripe has not been cooked previously, also cook the tripe for 1 hour. After all the meat has cooled properly, grind it all through a 3/16" grinder plate. You will find that after cooking all the meat there will be shrinkage, so add enough stock to bring the contents back up to green weight. Remove to stuffer and use artificial casings, beef middles, lined sewed hog bungs, or prime hog bungs.

COOKING

Cook in 160-165° F water until the internal temperature of 152° F is reached. This will require 1-1 1/2 hours. After cooking, place in ice-filled tub for quick chilling. Keep adding ice to the water if needed. Chill as rapidly as possible, which will require about 45 minutes, put product in cooler. Product may be wiped with cloth prior to removal to cooler, or sprayed with 180° F hot water. Liver sausage also may be smoked, using smoking instructions for braunschweiger.

RING LIVER PUDDING

INGREDIENTS FOR

25 LBS.

3/4 cup salt
4 Tb. onion powder
2-1/2 tsp. ground black pepper
2-1/2 tsp. ground marjoram
2-1/2 tsp. ground ginger
2-1/2 tsp. ground cloves
5 cups rye flour
7-1/2 lbs. pork livers
5 lbs. beef tripe
5 lbs. fat pork or jowls
7-1/2 lbs. pork snouts or pork skin
10 cups broth

INGREDIENTS FOR

10 LBS.

6 Tb. salt
1-1/2 Tb. onion powder
1 tsp. ground black pepper
1 tsp. ground marjoram
1 tsp. ground ginger
1 tsp. ground cloves
2 cups rye flour
3 lbs. pork livers
2 lbs. beef tripe
2 lbs. fat pork or jowls
3 lbs. pork snouts or pork skins
4 cups broth

Cook all the meat until it is well done. Save the broth, cool meat thoroughly - Grind through 3/16" grinding plate. Add all ingredients to meat and mix well, adding broth as you are mixing. Stuff into 40-43mm beef rounds. Place in preheated water and cook until internal temperature is 165° F.

When fully cooked remove from hot water and chill in ice water to an internal temperature of 40° F. Product is very perishable, eat as soon as possible or freeze item for future use.

BLOOD SAUSAGE (KISZKA)

INGREDIENTS FOR

25 LBS.

3/4 cup salt
5 Tb. onion powder
5 tsp coarse black pepper
1 Tb. marjoram
2-1/2 Tb. ground allspice
5 cups beef blood
5 tsp. Instacure No. 1
12-1/2 lbs. pork snouts
5 lbs. pork tongues
2-1/2 lbs. pork skins
5 lbs. buckwheat groats
or barley (cooked weight)

INGREDIENTS FOR

10 LBS.

5 Tb. salt
2 Tb. onion powder
2 tsp. coarse black pepper
1 heaping tsp. marjoram
1 Tb. allspice
2 cups beef blood
2 level tsp. Instacure No. 1
5 lbs. pork snouts
2 lbs. pork tongues
1 lb. pork skins
2 lbs. buckwheat groats or
barley (cooked weight)

PROCESSING & GRINDING

All meats must be cooked for at least 2 hours and then cooled. Grind the meats through a 3/16" grinder plate.

Place buckwheat groats or barley in a container and cover with boiling water for at least 2 hours. Be sure you place a cover on the container to prevent too much heat from escaping. (You may cook either of these items until the volume is doubled.) Remove and let cool.

After the meats and groats have cooled, place in a mixer and add seasonings, blood, and mix well. Stuff into beef bungs or beef middles. Blood sausage is then cooked in 160° F water until the internal temperature reaches 152° F. Remove from cooker and shower with cool water until the internal temperature is reduced to 110° F; place in cooler for at least 24 hours.

NOTE:

Since there always seems to be some breakage in the sausage business, you may add whatever broken sausage you have to the above formula. This blood sausage is spiced quite heavily and will cover up most other spices. You may add up to 4 lbs. of broken sausage to a 25 lb. formula. Be sure you account for the salt already in broken sausage

BLOOD & TONGUE SAUSAGE

INGREDIENTS FOR

25 LBS.

4 fresh onions
5 tsp. Instacure No. 1
5 Tb. ground black pepper
2-1/2 tsp. ground marjoram
2-1/2 tsp. thyme
2-1/2 Tb. mace
2-1/2 tsp. ground cloves
3/4 cup salt
9 lbs. pork tongues
9 lbs. pork snouts
3-1/2 lbs. pork skins
3-1/2 beef blood

INGREDIENTS FOR

10 LBS.

1 medium onion
2 tsp. Instacure No. 1
2 Tb. ground black pepper
1 tsp. ground marjoram
1 tsp. thyme
1 Tb. mace
1 tsp. ground cloves
5 Tb. salt
4 lbs. pork tongues
4 lbs. pork snouts
1 lb. pork skins
1 lb. beef blood (1 pint)

GRINDING & COOKING

Place all pork tongues and snouts into a kettle and cook approximately 2 hours. Let cool, then grind through a 3/4" grinder plate. The pork snouts also should be ground through a 3/4" grinder plate and pork skins should be ground through a 3/16" plate. Pork fat should be diced to 1/4" or 3/4" cubes and scalded for a few seconds using a sieve or screen.

Place all the meats and ingredients in a mixing tub and mix well. Stuff by hand into beef bungs and then place in 195-200° F water (but not boiling). Cook approximately 3 1/2 hours. Use a skewer to see if sausage is cooked sufficiently. Remove to container holding ice water, cooling enough that sausage can be handled. Remove to 36-38° F cooler overnight.

RICE LIVER SAUSAGE (HUNGARIAN STYLE)

INGREDIENTS FOR

25 LBS.

12 Tb. salt
1 cup onions
2-1/2 Tb. ground black pepper
2-1/2 tsp. marjoram
5 Tb. paprika
2 lbs. rice (uncooked)
12-13 lb. pork heads
6-7 lbs. pork livers
5 tsp. Instacure No. 1
5 cups broth

INGREDIENTS FOR

10 LBS.

5 Tb. salt
1 large onion
1 Tb. ground black pepper
1 tsp. marjoram
2 Tb. paprika
1 lb. rice (uncooked)
5-6 lbs. pork snouts
2-1/2 lbs. pork livers
2 tsp. Instacure No. 1
2 cups broth

PROCESSING

Cook the rice until tender; do not overcook. Cook headmeat until tender and save the broth. Do not boil; simmer only. Onions are to be sliced and fried in lard until they are a golden brown. Liver should be blanched in hot water for about 3 minutes.

GRINDING & COOKING

After meats have cooled, grind the headmeat through 3/16" grinder plate and the liver through 1/4" plate along with the fried onion. Put all the items in mixer, adding all the ingredients and the drained rice; add 10 lbs. of the broth the headmeat was cooked in to bring the finished yield up to 110%. Mix well until all items are evenly distributed. Stuff into 38-42mm hog casings. Cook sausage in 170° F preheated water for about 1 hour or until the internal temperature reaches 152° F.

Remove sausage from cooker and place in containers filled with water and ice; reduce internal temperature to 40° F. before placing in cooler overnight. Product is very perishable, eat as soon as possible - freeze leftovers.

LIVERWURST

INGREDIENTS FOR 25 LBS.

3/4 cup salt
5 Tb. onion powder
5 Tb. powdered dextrose
5 tsp. Instacure No. 1
2-1/2 Tb. ground white pepper
2-1/2 tsp. sage
2-1/2 tsp. marjoram
2-1/2 tsp. nutmeg
1-1/2 tsp. ginger
8-1/2 lbs. pork livers
8-1/2 lbs. pork snouts
8 lbs. beef tripe

INGREDIENTS FOR 10 LBS.

5 Tb. salt
2 Tb. onion powder
2 Tb. powdered dextrose
2 tsp. Instacure No. 1
1 Tb. ground white pepper
1 tsp. sage
1 tsp. marjoram
1 tsp. nutmeg
1/2 tsp. ginger
3-1/2 lbs. pork livers
3-1/2 lbs. pork snouts
3 lbs. beef tripe

COOKING & GRINDING

Cook pork snouts for approximately 1 hour, let cool and then grind all the meat through a 3/16" grinder plate. (Pork snouts should be weighed before grinding; you may have to add stock to bring snouts back up to green weight.) Add all the ingredients and mix well until all the spices are evenly distributed; regrind using 3/16" plate. Liverwurst should be stuffed into a beef middle, sewed hog bungs or prime hog bungs. There also are sewed synthetic casings available. Water should be precooked to 180°F; liverwurst will then be placed into water and temperature allowed to drop to 160-165° F. Cook until an internal temperature of 150-152° F is obtained (1-1 1/2 hours). After cooking, remove to a tub filled with ice and water for a quick chill; add sufficient ice to chill as rapidly as possible, which will require at least 45 minutes. Remove liverwurst from ice water and let dry at room temperature; remove to cooler overnight.

ALTERNATE MEATS

1 cooked hog head
1 cooked hog tongue

1 cooked hog heart
1 cooked hog liver

PREPARATION

Cook hog head in kettle until the meat will strip from the bones easily. Cook hearts, tongues and livers until tender. Remove small bones from tongue. Remove all the meat from kettle, being careful to avoid getting any bone mixed with meat. Add 10% stock for each 25 lbs. of meat to bring up to green weight.

CHAPTER IX

Specialty Loaves and Sausage

JELLIED TURKEY LOAF

INGREDIENTS FOR

25 LBS.

25 lbs. cooked turkey
2/3 cup salt
2-1/2 tsp. onion powder
3/4 cup chopped pimento
1-1/2 cups gelatin
3/4 cup powdered dextrose
5 quarts broth

INGREDIENTS FOR

10 LBS.

10 lbs. cooked turkey
4 Tb. salt
1 tsp. onion powder
5 Tb. chopped pimento
2/3 cup gelatin
4-1/2 Tb. powdered dextrose
8 cups broth

Large turkeys are recommended to make this loaf, because the meat comes off the bones much easier when it is cooked. Also, the ratio of meat to bones is greater.

Turkey meat may be cut into smaller pieces and cooked until it is tender; do not overcook. Remove the turkey from the broth and allow to cool before boning.

Meat is ground through a 1/2" grinder plate and mixed with the other ingredients, except the gelatin and broth. Heat the cooled broth to 160° F, skimming the surface fat before heating. Dissolve gelatin and pour over the meat mixture, mixing thoroughly as you go. Mixture may then be poured into molds or any size fibrous casing. Place in cooler and allow to set overnight before using.

IMPORTANT!

Do not allow the broth to cook beyond 160° F. The gelatin will lose all its binding power at 170° F.

CORNERD BEEF HASH

INGREDIENTS FOR 10 LBS.

6 lbs. cornerd beef
4 lbs. boiled potatoes
9 Tb. onion flakes
2 Tb. salt
2 tsp. Instacure No. 1

The cornerd beef is brought to a boil - then simmered until tender, approximately 4 hrs and then cooled off. Grind meat through 3/16" or 1/4" grinder plate. Peeled potatoes are boiled and cut into 1/2" cubes. Onion flakes should be soaked until they become tender. All ingredients then are added and gently mixed, to avoid mashing the potato cubes. Cornerd beef may be stuffed into 3-1/2" fibrous casings.

BRAUN LOAF

Braun loaf is a type of sausage usually made by people who raise their own hogs. The meat that is used to make it is available from all the large meat packers. It is sometimes possible to buy this meat in smaller quantities from your local sausage maker when it is not available at your local supermarket or butcher shop.

This sausage or loaf can be made by using any combination of the following meat: pork tongues, pork cheeks, pork snouts and pork hearts. When using hearts, be sure all the arteries and blood clots on the surface are removed. It is also important to note that if you're purchasing pig snouts or cheeks, it is best to buy the meat of a younger animal, as it is usually quite lean. It should also be noted that up to 10% of pork skins may be added to this formula; however, they should be defatted. Pork skins can act as a binding agent when making this loaf.

For each gallon of brine, use 1-1/4 lbs. of salt and 1-1/2 ozs. of Instacure 1. The meat is immersed in the pickle for at least 7 days at 34-36° F. Then place it in fresh water and simmer until tender.

The pig skins should be cooked separately to prevent overcooking, as this causes them to lose their binding quality. The stock should be put aside for further use after the meat is cooked and allowed to cool. The cooked meat can then be chilled in cool water.

Grind the pork cheeks through a 3/16" grinder plate; the rest of the meat should be cut into 1 to 1-1/2" pieces. Weigh all the meat to compare it to the original starting weight. Will be a difference, or shortage, which is then made up by adding the pork skin stock until you reach the original weight. You may add up to 10% more than what you started with.

Then add the following mixture of spices to the stock along with the meat and cook until the water reaches 180° F, stirring the stock as you go along.

1-1/4 cup ground white pepper
4 Tb. ground ginger
2 Tb. ground mace
2 Tb. ground allspice
3 Tb. ground caraway seeds
6 Tb. onion powder
10 oz.

NOTE:

The above spices are enough for 100 lbs. of meat. Add 2 1/2 ozs. of the mixture for 25 lbs. of meat, or 1 ounce for 10 lbs. of meat.

Additional salt or cure are not required since the meat already has been cured and salted.

CHILI CON CARNE

INGREDIENTS FOR

25 LBS.

18-1/2 lbs. lean beef
7-1/2 lbs. beef suet
2/3 cup salt
4 Tb. onion powder
2-1/2 tsp. garlic powder
1/2 cup ground paprika
7-1/2 lbs. wheat flour
5 Tb. chili powder
5 lbs. red kidney beans

INGREDIENTS FOR

10 LBS.

8 lbs. lean beef
2 lbs. beef suet
4 Tb. salt
1-1/2 Tb. onion powder
1 tsp. garlic powder
3 Tb. ground paprika
3-1/2 lbs. wheat flour
2 Tb. chili powder
2 lbs. red kidney beans

Kidney beans are optional

Grind the beef and suet separately using a 3/8" grinder plate. The suet is melted down, discarding the cracklings. Add the lean beef to the melted suet and cook. You may add water or tomato juice to help the meat cook. Meat should be allowed to brown (water/juice should come to boiling point, then reduced to simmer).

During the simmering period, add the seasonings (except the beans and flour). After they are mixed in, add the flour a little at a time, stirring as you go along to prevent lumps.

If you want kidney beans, they may be added during the last 10 minutes of cooking. Add additional water or tomato juice if the chili is too thick. Pour the chili into molds or fibrous casings and allow to cool. Chili keeps well when frozen.

HEAD CHEESE

INGREDIENTS FOR 25 LBS.

1-1/4 cups salt
2-1/2 cups gelatin, dissolved in
10 cups warm water
5 Tb. ground white pepper
2-1/2 tsp. ground ginger
1-1/2 tsp. allspice
2-1/2 tsp. ground caraway seeds
2-1/2 Tb. onion powder
2-1/2 tsp. ground marjoram
2-1/2 Tb. ground cloves
12-1/2 lbs. pork tongues
10 lbs. pork snouts
2-1/2 lbs. pork skins

INGREDIENTS FOR 10 LBS.

7-1/2 Tb. salt
1 cup gelatin, dissolved in
4 cups warm water
2 Tb. ground white pepper
1 tsp. ground ginger
1/2 tsp. allspice
1 tsp. ground caraway seeds
1 Tb. onion powder
1 tsp. ground marjoram
1 Tb. ground cloves
5 lbs. pork tongues
4 lbs. pork snouts
1 lb. pork skins

FOR 10 LBS. RECIPE

Cure meat for 3 - 5 days in a brine made with:

2-1/2 gals. water
2-1/2 lbs. salt
12 ozs. cane sugar
1/2 cup Instacure No. 1

After curing, place all meat loosely in steam kettle. Cover with sufficient amount of water. Place the pork skins in cooking net. Cook for approximately 1-1/2-2 hours. After cooking, remove from kettle and let cool. Grind pork skins through 3/16" grinder plate. Grind the remaining meat through a 1-1/2" plate. After grinding, add other ingredients and sufficient amount of cooking stock to arrive at a finished yield of 110-115%.

After the product is thoroughly mixed, stuff by hand into beef bung or hog stomach casings. Place in cooler and chill for 12 hours at 34-36° F (If forming is done in molds, place molds in ice water for approximately two hours to assist in rapid chilling) After chilling, remove from molds and place on rack, properly spaced, in 38-40° F cooler. Chill at this temperature overnight.

SOUSE

INGREDIENTS FOR

25 LBS.

2-1/2 lbs. diced red peppers
2-1/2 lbs. diced sweet pickles
1-2/3 cups gelatin, dissolved in
10 cups warm water
1-1/4 cup white vinegar
1-1/4 cup salt
2-1/2 Tb. ground white pepper
2-1/2 Tb. ground mustard
2-1/2 Tb. ground sage
5 Tb. ground cloves
2-1/2 Tb. onion powder
12-1/2 lbs. pork tongues
10 lbs. pork snouts
2-1/2 lbs. pork skins

INGREDIENTS FOR

10 LBS.

1 lb. diced red peppers
1 lb. diced sweet pickles
2/3 cup gelatin, dissolved in
4 cups warm water
1/2 cup white vinegar
7-1/2 Tb. salt
1 Tb. ground white pepper
1 Tb. ground mustard
2 Tb. ground sage
2 Tb. ground cloves
1 Tb. onion powder
5 lbs. pork tongues
4 lbs. pork snouts
1 lb. pork skins

FOR 10 LBS. RECIPE

Cure meat 3-5 days in a brine made with the following:

2-1/2 gal. water
2-1/2 lbs. salt
12 ozs. cane sugar
1/2 cup Instacure No. 1

After curing, place all meat loosely in steam kettle. Place the pork skins in cooking net; then cover product with water and raise to boiling temperature. Cook for approximately 1-1/2-2 hours. After cooking, remove from kettle and let cool. Grind pork skins through 3/16" grinder plate. Grind the remaining meat through a 1/2" plate. After grinding, add other ingredients and sufficient amount of cooking stock to arrive at a finished yield of 110-115%.

After the product is thoroughly mixed, stuff into suitably-sized mold and chill for 12 hours at 34-36° F. Place molds in ice water for approximately two hours to assist in rapid chilling. After chilling, remove from molds and place on rack, properly spaced, in 38-40° F cooler. Chill at this temperature overnight.

PENNSYLVANIA SCRAPPLE

Pennsylvania scrapple also is known as Philadelphia scrapple to many people. It is truly classed as an original American sausage. It was first developed by the German immigrants who were mistakenly called the Pennsylvania Dutch. The other people of this area had difficulty in pronouncing "Deutsche," so the name of "Pennsylvania Dutch" was given to these German immigrants. Scrapple is a very popular sausage in the Northeastern USA and served for breakfast like corned beef hash, bacon or sausage. A very good scrapple is made from the byproducts of beef, pork or both.

INGREDIENTS FOR 10 LBS.

- 5 lbs. pork meat (ears, snouts, jowls, etc.)
- 5 lbs. beef cheeks or hearts
- 6 cups stock from cooked meat
- 2 lbs. white corn meal
- 1 Tb. onion chips
- 2 Tb. salt
- 1 Tb. ground white pepper
- 1 tsp. ground celery seeds
- 1 Tb. sage
- 1 tsp. ground marjoram
- 2 tsp. Instacure No. 1

All meat is placed in a container with the salt and Instacure No. 1. Meat is cooked slowly until tender; do not boil. Meat is removed, allowed to cool and ground through a 3/8" grinder plate.

The meat stock then is brought up to boiling, add all the ingredients except the corn meal. After all ingredients are mixed, add the corn meal slowly stirring to avoid lumps. Mix well and add meat. Scrapple may be stuffed into any size fibrous casings or simply formed in a meat loaf pan. Allow to cool for 24 hours before using.

ALLMEAT POLISH SAUSAGE IN VINEGAR PICKLE

For pickling in vinegar, the allmeat sausage is best. This popular bar sausage must be smoked, cooked and dried before pickling. Corn syrup solids are used in this formula rather than soy protein concentrate. Meat should be pork butts 80% lean, 20% fat.

INGREDIENTS FOR

25 LBS.

5 cups water
1-1/4 cup corn syrup solids
3/4 cup salt
2-1/2 Tb. powdered dextrose
2-1/2 tsp. ground marjoram
5 tsp. Instacure No. 1
5 large garlic cloves
2-1/2 Tb. ground black pepper
25 lbs. Pork butts

INGREDIENTS FOR

10 LBS.

2 cups water
1/2 cup corn syrup solids
5 Tb. salt
1 Tb. powdered dextrose
1 tsp. ground marjoram
2 tsp. Instacure No. 1
2 large garlic cloves
1 Tb. ground black pepper
10 lbs. Pork butts

Above sausage is processed exactly like smoked Polish sausage. After sausage has been smoked, cooked and cooled, place sausage in large storage jar. Heat one bottle of white vinegar with 1/4 cup pickling spices. Bring to a boil. Cool slightly, pour vinegar with spices over sausage in jars filling to capacity making sure there are no air pockets between the sausages.

It is best to process with white vinegar. Finished product holds up well under refrigeration.

VINEGAR PICKLED PORK HOCKS or PIG'S FEET

BRINE FORMULA

1 gallon water
1-1/2 cups salt
1/2 cup Instacure No. 1

CURING AND COOKING

The above formula is enough for 15 lbs. of pork hocks or pig's feet. Meat is placed into container with brine mixture; bring temperature up to 210° F. Heat is shut off and meat allowed to stay in pickle all night. The next morning, bring temperature up to 180° F and cook until tender. Remove meat from container, and rinse under hot shower to remove fat from the surfaces. Place back into container and run cold water over meat to over flow. Run water until meat is chilled. This also helps to bring unwanted fat particles to the surface.

Feet can be made boneless or semiboneless, depending on the individual. Feet are soaked in white vinegar overnight. Remove from vinegar and rinse with cold water until all surface fat is removed. If not properly washed, the vinegar will become cloudy. Pig's feet may be packed in jars filled to capacity with white vinegar. You may add whole bay leaves or red peppers, for color.

ALTERNATE METHODS

Pig's feet also are prepared by cooking in water until tender, or until meat is coming off the bones. Pickling spices are added while cooking. About 1/2 to 3/4 of the broth is poured off and allowed to cool. After cooking, the broth is then tossed or scrambled and served in that manner.

Another method is to cook until meat separates from bones, adding bay leaves rather than pickling spices. After completely cooked bones are removed, broth and meat are allowed to cool and set up like jello. Served with a little splash of white vinegar, this is a traditional Polish dish.

OLD FASHIONED LOAF

INGREDIENTS FOR

25 LBS.

8 cups ice water
5 cups nonfat dry milk
3/4 cup salt
1-1/2 cups corn syrup solids
2-1/2 Tb. coriander
2/3 cup onion powder
2-1/2 Tb. ground celery
2-1/2 Tb. ground white pepper
5 tsp. Instacure No. 1
18 lbs. pork butts
7 lbs. beef chuck
2-1/2 cups soy protein
concentrate

INGREDIENTS FOR

10 LBS.

4 cups ice water
2 cup nonfat dry milk
5 Tb. salt
1/2 cup corn syrup solids
1 Tb. coriander
4 Tb. onion powder
1 Tb. ground celery
1 Tb. ground white pepper
2 tsp. Instacure No. 1
7 lbs. pork butts
3 lbs. beef chuck
1 cup soy protein
concentrate

GRINDING & MIXING

Grind all the lean pork through a 3/16" grinder plate into the mixer and add 3/4 of all the ingredients except ice water, soy protein concentrate and nonfat dry milk. Mix well. Grind all of the beef plates through 3/16" grinder plate, adding the balance of the ingredients. After mixing, stuff into pans, bake in a smokehouse for about 8 hours at 170° F or until the internal temperature reaches 152° F. Remove and let cool overnight under refrigeration before slicing.

NOTE:

For pepper loaf, you may sprinkle coarse black pepper on top of the loaves before cooking.

PICKLE & PIMENTO LOAF

INGREDIENTS FOR

25 LBS.

18 lbs. lean beef
7 lbs. lean pork
10 cups ice water
1-1/4 cups corn syrup solids
1-2/3 cups soy protein
concentrate
2-1/2 cups nonfat dry milk
4 cups chopped sweet pickle
4 cups chopped pimentos
1 Tb. ginger
1Tb. onion powder
2 tsp. mace
5 tsp. Instacure No. 1
3/4 cup salt

INGREDIENTS FOR

10 LBS

7 lbs. lean beef
3 lbs. lean pork
4 cups ice water
1/2 cup corn syrup solids
2/3 cup soy protein
concentrate
1 cup nonfat dry milk
1-1/2 cups chopped sweet pickle
1-1/2 cups chopped pimentos
1 tsp. ginger
1 tsp. onion powder
1/2 tsp. mace
2 tsp. Instacure No. 1
5 Tb. salt

This type of loaf traditionally is a fine textured luncheon meat (follow emulsified instructions on page 200) and is cooked in pans submerged in water. For home use, this product may be stuffed into 6" fibrous casings.

All meats can be ground with a 1/4" grinder plate, then mixed with all ingredients, adding the water last. Stuff into casings or pans and cook in 160° F water until internal temperature reaches 152° F. Place in cold water until internal temperature is reduced to 70-75° F.

VEAL LOAF

This same recipe may be used to make veal loaf. Simply replace the pork with veal and follow the same directions, omitting pickles and pimentos.

HONEY LOAF

INGREDIENTS FOR 25 LBS.

25 lbs. pork butts
5 cups ice cold water
3/4 cup salt
1-1/4 cups corn syrup solids
2-1/2 cups honey
3 Tb. onion powder
2-1/2 Tb. ground white pepper
5 tsp. ground celery
5 tsp. Instacure No. 1

INGREDIENTS FOR 10 LBS.

10 lbs. pork butts
2 cups ice cold water
5 Tb. salt
7 Tb. corn syrup solids
1 cup honey
4 tsp. onion powder
1 Tb. ground white pepper
2 tsp. ground celery
2 tsp. Instacure No. 1

GRINDING & MIXING

Grind all lean meat through a coarse plate about 3/8". All fat meat should be ground through a fine plate either 3/16" or smaller. All ingredients are to be mixed thoroughly with meat.

Honey loaf usually is placed in a pan and cooked in water at 160° F until the internal temperature reaches 152° F. It then is removed and chilled in water until the internal temperature reaches 70-75° F. It is placed under refrigeration for 24 hours before using.

Honey loaf may also be stuffed into a fibrous casing about 5-6 inches in diameter when making this sausage at home. The metal submergable pans are quite expensive and only used in commercial operations.

LEBERKASE

INGREDIENTS FOR 25 LBS.

2-1/2 cups soy protein
concentrate
5 cups ice water
2-1/2 large onions
3/4 cup salt
2-1/2 Tb. powdered dextrose
5 tsp. Instacure No. 1
2-1/2 Tb. marjoram
2-1/2 tsp. ginger
2-1/2 Tb. ground mustard
5 Tb. nutmeg
5 Tb. ground black pepper
8-1/2 lbs. boneless beef
8-1/2 lbs. regular pork trimmings
7-1/2 lbs. lean pork
shoulder or butts
1/2 lb. pork liver

INGREDIENTS FOR 10 LBS.

1 cup soy protein
concentrate
2 cups ice water
1 large onion
5 Tb. salt
1 Tb. powdered dextrose
2 tsp. Instacure No. 1
1 Tb. marjoram
1 tsp. ginger
1 Tb. ground mustard
2 Tb. nutmeg
2 Tb. ground black pepper
3-1/2 lbs. boneless beef
3-1/2 lbs. regular pork trimmings
2-3/4 lbs. lean pork
shoulder or butts
1/4 lb. pork liver

GRINDING

Grind all beef, cow, or bullmeat through a 1/4" grinder plate. Pork liver should be scalded and ground through a 1/4" plate. Then place in mixing tub and add the cure with soy protein concentrate and ice water. The remainder of the meats should be ground through a 3/8" plate, and placed into the mixer.

Mix well until all the ingredients are evenly distributed, pack into stuffer tightly to prevent air pockets. Leberkase should be stuffed into 3-1/2" x 24" fibrous casings. Place into 38-40° F cooler. Let age at least one hour or more.

COOKING

Preheat water to 180° F; the temperature will drop to around 160° F when all the meat is placed into cooker. Cook at 160-170° F until internal temperature of 152° F is obtained. Remove and shower with cold water until the internal temper-

ature is reduced to 120° F. Place in cooler overnight. Leberkase may also be packed into baking pans and cooked in an oven using the following temperatures:

120° F for 30 minutes

150° F for 30 minutes

180° F for 30 minutes

180-200° F for 3-1/2 hours or until an internal temperature of 15° F is obtained. Remove and let cool overnight.

NOTE:

This formula may also be used for "Dutchloaf" by simply omitting the pork liver and grinding all the meat through a 1/4" grinder plate.

MERQUEZ SAUSAGE

INGREDIENTS FOR 25 LBS.

12.5 lbs. Boneless Pork Butt
12.5 lbs. Boneless Lamb
10 bay laurel leafs crushed
5 tsp. Mint Flakes
5 tsp. whole thyme
2/3 cup Purified Salt
1 Tb. coarse black pepper

HOT SAUCE

1/2 cup Olive Oil
3/4 cup Hot (Bottled)
Jalapeno Pepper Chopped
3/4 cup Cracked Garlic or
25 Fresh Cloves sliced thin
1 Tb. Cayenne Pepper

INGREDIENTS FOR 10 LBS.

5 lbs. Boneless Port Butt
5 lbs. boneless lamb
4 bay laurel leafs crushed
2 tsp. mint flakes
2 tsp. whole thyme
4 Tb. purified salt
1 tsp. coarse black pepper

HOT SAUCE

3 Tb. Olive oil
5 Tbs. Hot (Bottled)
Jalapeno Pepper Chopped
5 Tbs. Cracked Garlic or 10 Fresh
Cloves sliced thin
1 tsp. cayenne pepper

I would like to thank Annie Sargent of Oren, UT. for this excellent recipe. I improvised on the hot sauce, but the basic ingredients came from Annie.

PREPARATION

Chill meat to 32°-34° F, clean lamb and pork of all clots, bones and unwanted grizzle. Grind through 3/8" grinder plate. Place in large pot or tub for mixing, add all of the prepared ingredients and mix thoroughly.

STUFFING

Flush and rinse approximate amount of 32 to 35 mm hog casings in advance and let stand in cold water under refrigeration.

Stuff into casings when all ingredients are ready. Do not over stuff make 4" to 5" links for pan frying or grilling. Store in refrigerator for 24 hrs. before using. Unused portions can be held under refrigeration 3 to 4 days. Merquez sausage can be grilled, pan fried or par boiled and simmered. Freeze after 3

or 4 days. Enjoy

OPTION: If you really like it hot, use dried red Chili pepper flakes in place of the jalapeno peppers or add cayenne pepper to your taste.

MACEDONIAN LEEK SAUSAGE (LUKINSCHENA)

INGREDIENTS FOR

25 LBS.

25 Lb. Pork Butts
1/2 cup Olive Oil
18 Leeks (white & green parts)
3/4 cup Salt
3/4 cup Hot Crushed
Peppers
2-1/2 cups Ice Water
2-1/2 tsp. White Pepper

INGREDIENTS FOR

10 LBS.

10 Lb. Pork Butts
3 Tbs. Olive Oil
7 Leeks (white & green parts)
5 Tb. Salt
5 Tb. Hot Crushed
Peppers
1 cup Ice Water
1 tsp. White Pepper

If you desire a hotter sausage, additional crushed peppers or cayenne pepper can be added to your taste.

PREPARATION

Wash leeks thoroughly, chop up fine, saute in olive oil. After leeks are sauteed, cool thoroughly and drain well.

MIXING

Add spices, water and leek into ground meat and mix well, until all ingredients are evenly distributed. This is a good time to check your meat for taste. Make a small patty and pan fry until done. You can also zap a small patty in the microwave, about 1-1/2 to 2 minutes, depending on size. Should you want a spicier sausage, this would be the time to add whichever spices you desire to the mix.

STUFFING

Prepare in advance 32 to 35 mm hog casings for 10 lbs. of meat, flush casings with water. Stuff meat into casing and place into refrigerator. This sausage is a fresh sausage and will taste better the next day after allowing all the ingredients to age over night. Unused sausage should be frozen for future use.

GREEK LUKANIKA SAUSAGE

INGREDIENTS FOR 25 LBS.

25 Lbs. Pork Butt
3/4 cup Salt
25 Cloves Garlic Crushed or Sliced
5 Tb. Ground Thyme
5 Tb. Marjoram
1/2 cup Grd. Allspice
5 tsp. Crushed Bay Leaf
1/2 cup Grated Orange Peel
3-3/4 Cups Red Wine

INGREDIENTS FOR 10 LBS.

10 Lbs. Pork Butt
5 Tb. Salt
10 Cloves Garlic Crushed or Sliced
2 Tb. Ground Thyme
2 Tb. Marjoram
3 tsp. Grd. Allspice
2 tsp. Crushed Bay Leaf
3 Tb. Grated Orange Peel
1-1/2 Cups Red Wine

Chill pork butt to 32 to 34° F, remove any clots, grind pork butt through 3/4" grinder plate. In a large container, mix meat and all spices, including wine until thoroughly and evenly mixing. Stuff into flushed 32-35 mm hog casing.

Place into refrigerator overnight to age. Pan fry or cook on grill. Can also be made into patties.
Freeze unused portions.

DANISH PORK SAUSAGE

INGREDIENTS FOR

25 LBS.

18 Lb. Boneless Pork Butt
7 Lb. Boneless Veal or
25 Lb. Boneless Pork Butt
2-1/2 Cup Potato Flour*
5 Large Onions
1/2 cup Salt
4 Tb. Sugar
2 Tb. White Pepper
2 Tb. Allspice
2-1/2 tsp. Grd. Cloves
2-1/2 tsp. Grd. Ginger
12 Cups Pork Stock**

INGREDIENTS FOR

10 LBS.

7 Lb. Boneless Pork Butt
3 Lb. Boneless Veal or
10 Lb. Boneless Pork Butt
1 Cup Potato Flour*
2 Large Onions
3 Tb. Salt
1 1/2 Tb. Sugar
3/4 Tb. White Pepper
3/4 Tb. Allspice
1 tsp. Grd. Cloves
1 tsp. Grd. Ginger
5 Cups Pork Stock**

*Potato flour is obtainable in a health food store, regular white flour may be used.

**Can also use pork bouillon, chicken bouillon or plain water.

GRINDING AND MIXING

Chill meat to 32-34° F for grinding. Grind through 3/16" plate. Can be ground two times if desired. Place ground meat into large container, add flour and all seasonings. Mix thoroughly, adding pork stock a little at a time, until mix has consistency of firm mush.

COOKING

Place the sausage in a 10" frying pan with 1 cup water. Cook for five minutes on one side, turn and cook additional two to three minutes. Drain water from pan, add butter to pan, brown sausage on each side and serve - Bon Appetite. Tastes great with milk gravy made from pan drippings, flour and milk.

IRISH SAUSAGE

INGREDIENTS FOR

25 LBS.

25 lb. Pork Butts
25 Cups Bread Crumbs
20 Eggs
35 Garlic Cloves Crushed
5 Tb. Salt
5 Tb. Thyme
5 Tb. Basil
5 tsp. Rosemary
5 tsp. Marjoram
5 tsp. pepper
12 Cups Ice Water

INGREDIENTS FOR

10 LBS.

10 lb. Pork Butts
10 Cups Bread Crumbs
8 Eggs
14 Garlic Cloves Crushed
2 Tb. Salt
2 Tb. Thyme
2 Tb. Basil
2 tsp. Rosemary
2 tsp. Marjoram
2 tsp. pepper
4 Cups Ice Water

Chill pork to 32-34° F. Grind through 1/4" plate. Mix all ingredients into meat. Stuff into 24-26 mm flushed sheep casings. Age in refrigerator for 24 hours. Pan fry in butter, may also be grilled. Freeze unused portions after a few days.

NORTH AFRICAN SAUSAGE #1

INGREDIENTS FOR

25 LBS.

18 Lbs. Lamb
7 Lbs. Veal
8 LG Chopped Onions
2.5 Cup Butter or Margarine
5 Cup Oat Bran
25 Cloves Garlic, Minced
2-1/2 tsp. Allspice
5 tsp. Cinnamon
2/3 cup Olive Oil
10 Eggs
2/3 cup Salt
2-1/2 tsp. Coarse Black Pepper
2-1/2 tsp. Cayenne Pepper (add
more if your palette calls for it)
2-1/2 cup Ice Water

INGREDIENTS FOR

10 LBS.

7 Lbs. Lamb
3 Lbs. Veal
3 LG Chopped Onions
1 Cup Butter or Margarine
2 Cup Oat Bran
10 Cloves Garlic, Minced
1 tsp. Allspice
2 tsp. Cinnamon
1/4 cup Olive Oil
4 Eggs
4 Tb. Salt
1 tsp. Coarse Black Pepper
1 tsp. Cayenne Pepper (add
more if your palette calls for it)
1 cup Ice Water

Chill meat to 32-34° F. Grind through a 1/4" grinding plate. Saute garlic and onion in olive oil and butter. In separate large mixing container, mix thoroughly with ground meat all the ingredients, add sauteed garlic, and onion.

Stuff into 24-26 mm flushed sheep casings, making links about 6" long. Age 24 hrs. in refrigerator. Pan fry over medium heat about 10 minutes. Can also be grilled. Freeze unused sausages for future use after 1 or 2 days.

Serve with Cos Cous and your favorite vegetable.

The recipe was donated to us by a good friend from Egypt

NORTH AFRICAN SAUSAGE #2

INGREDIENTS FOR

25 LBS.

25 Lbs. Boneless Lamb
2.5 Cup Ice Water
5 Cups Chopped Parsley
2/3 cup Salt
8 Cups Chopped Onion
2.5 Tb. Coarse Black Pepper
5 Tb. Cayenne Pepper
2.5 Tb Marjoram
2.5 Tb. Oregano
2.5 tsp. Ground Cumin

INGREDIENTS FOR

10 LBS.

10 Lbs. Boneless Lamb
1 Cup Ice Water
2 Cups Chopped Parsley
4 Tb. Salt
3 Cups Chopped Onion
1 Tb. Coarse Black Pepper
2 Tb. Cayenne Pepper
1 Tb Marjoram
1 Tb. Oregano
1 tsp. Ground Cumin

Chill meat to 32-34° F . Grind through 1/4" plate. Mix all ingredients with meat thoroughly. Stuff into a 24-26 mm flushed sheep casing. Link sausage 4" to 6" long. Age for 24 hours in refrigerator. Pan fry or grill. Freeze unused portions for future use after one or two days.

ANDOUILLE SAUSAGE

5 lbs. pork butts
2 cloves of garlic
3 bay leaves crushed
2 large onions
1 Tb. salt
1 Tb. pepper
1 tsp. cayenne pepper
1 tsp. chili pepper
1/2 tsp. ground mace
1/2 tsp. ground cloves
1/2 tsp. allspice
1 Tb. thyme
1 Tb. marjoram
1 Tb. parsley

Grind meat through 3/8", grinder plate. Mix thoroughly with remaining ingredients, add 1 cup of water to help in mixing. Stuff into 32 x 35 mm hog casings.

Andouille can be made fresh or smoked. If you are smoking andouille, add 1 cup of soy protein concentrate and 1 level teaspoon of Instacure No. 1. (You can smoke this like you would smoked Polish sausage.)

CHAPTER X

Game Meat

VENISON OR BEEF JERKY

Beef jerky is one of the most sought after-and probably the easiest to use-of all the recipes in this book. A dried meat closely associated with the early American pioneers, this recipe has been handed down to us in a very simple formula.

It is well-known that this product was usually dry-salted and hung out in some manner to dry. The process reduced the weight of the meat by as much as 80-85%. Obviously, it was lighter to transport, took up less room and required no refrigeration.

During the course of these journeys, many stops were made for a number of reasons, preferably near a stream. The meat could then be placed in a running stream to remove most of the salt. At the same time, this meat was being reconstituted by absorbing water from the stream. The meat now was more palatable and could be used to make stew or other dishes. The smaller pieces of this salted and dried meat, however, became of snack, eaten at random without removing the salt.

Beef jerky is closely associated with the early American cowboys or miners. In either case, beef jerky still is made the old-fashioned way by either dry salting or brining in a very hard salted water. Then it is simply hung up or laid out to dry; however, a jerky using this type of formula is not very palatable, and there now are a variety of recipes that make this a very tasty snack. If you decide to use plastic bags for storage, make sure bag is not tightly secure, the little moisture that is left will cause mold. Best to leave bag in a loose untied state or place in brown paper lunch bag.

I think the following recipe will be extremely pleasing to your taste buds.

3 lbs. of lean beef or venison
1 tsp. salt
1 tsp. Instacure No. 1
1 tsp. onion powder
1 tsp. garlic powder
1 tsp. ground black pepper
1/4 cup soy sauce
1/3 cup Worcestershire sauce

PREPARATION

Beef jerky also can be made from a variety of game meats such as moose, elk or antelope. You never should use pork, as it may contain the trichinae parasite. By the same token, if pork were treated to destroy trichinae, by freezing in the prescribed USDA manner stated in the chapter "Destroying Trichinae," you may even use pork to make jerky.

The meat is made as lean as possible by removing all fat, sinew and gristle. Too much fat in the jerky can cause it to go rancid. The meat then is cut into strips about 1/4"x1/2" thick and 1/2"x3/4") in width. The ingredients then are all mixed and poured over the meat. Meat then should be mixed gently to distribute the sauce more evenly. Let meat marinate in refrigerator for 24 hours. Meat should be turned over once or twice during this 24-hour period.

DRYING

Jerky may be dried in a variety of ways, depending on your locality. If you live in a dry desert country, you can usually dry the jerky in about seven days or less during summer months in a garage. If you own a fruit dehydrator, the instructions that came with it can be applied to drying jerky. You can also dry jerky in a kitchen stove-gas or electric. Meat is placed on oven grids, properly spaced apart, and the heat from the pilot light is sufficient to dry jerky in 3-4 days. Attics also are a great place to dry jerky, as that is usually a very dry part of the house no matter how humid the area is. Jerky then is packed in glass containers with metal tops that have holes punched in them to prevent mold.

NOTE:

If you plan to make about 9 lbs. of jerky, the ingredient formulas can simply be tripled. This is a large amount of jerky and would not fit into your kitchen oven at one time. Assuming you would use the attic, or garage in the desert climate, you can easily make a container to hold 9 lbs.

Simply make a rectangular box using 2" by 4" lumber. Dimensions are 2 feet by 4 feet. On the bottom part, nail on a 1/4 mesh galvanized screen. Then over the top of this you nail a regular fly screen. After placing jerky into this container, the top is covered with cheese cloth or plain bed sheet. The fly screen keeps insects out of the bottom, and the cloth keeps them out on top. The meat has excellent air circulation.

Preparing Beef Jerky



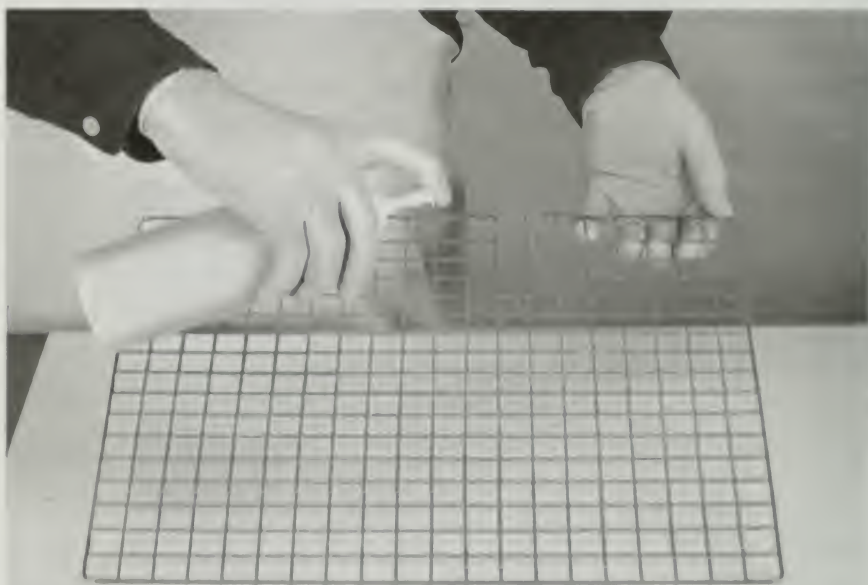
The meat above has been partially frozen for easier slicing. The meat should be sliced in pieces 1/4"-1/2" in thickness, making sure all the fat has been trimmed.



The next step is to cut the sliced meat into strips 3/4" to 1" thick.

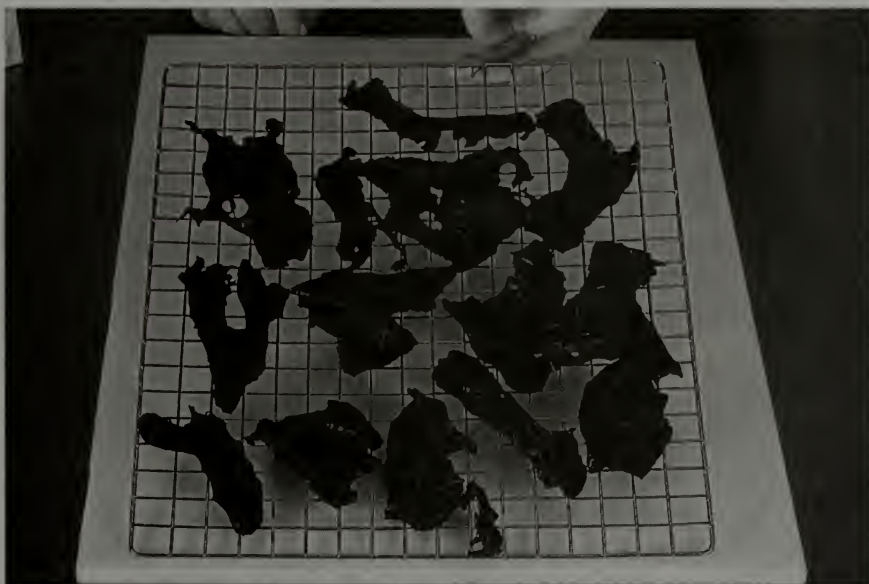


The meat is then placed into a container with all the ingredients and mixed well. Marinate in the refrigerator for 24 hours, overhauling at least once during this period.



The screens or shelves should be sprayed with some sort of anti-sticking agent like Peel Ease. Otherwise, the meat will stick to the shelves after it dries.

The beef jerky is then placed on the shelves, properly spaced, and dried in the smoker at 90°-100° F.



The jerky above has a moisture loss of 70-80%.

SMOKED VENISON POLISH SAUSAGE

INGREDIENTS FOR

25 LBS.

10 cups water
5 cups soy protein concentrate
3/4 cup Salt
5 Tb. powdered dextrose
5 tsp. Instacure No. 1
2-1/2 Tb. fine black pepper
5 cloves fresh garlic
2-1/2 Tb. marjoram
20 lbs. lean elk or venison
5 lbs. pork trimmings

INGREDIENTS FOR

10 LBS.

4 cups water
2 cups soy protein concentrate
5 Tb. Salt
2 Tb. powdered dextrose
2 tsp. Instacure No. 1
1 Tb. fine black pepper
2 large cloves of fresh garlic
1 heaping tsp. marjoram
8 lbs. lean elk or venison
2 lbs. pork trimmings

GRINDING

Chill all meat and grind through 1/4" or 3/16" grinder plate. Be sure all the blood clots, bones and sinews have been removed. Place meat into mixer, add all the remaining ingredients. Mix well. Remove, place in stuffer and use 35-38mm hog casings for stuffing.

SMOKING

Let sausage dry at room temperature for about 45 minutes after stuffing. Remove to smokehouse preheated at 120° F and leave dampers wide open. Sausage will dry more for about 45 minutes. After this period, gradually adjust smoker to 160-170° F with dampers 1/4" open. Allow product to smoke until the internal temperature reaches 152° F.

VENISON THURINGER

INGREDIENTS FOR

25 LBS.

1 cup salt
5 tsp. Instacure No. 1
1-1/4 cups powdered dextrose
2-1/2 Tb. ground black pepper
2-1/2 tsp. ground ginger
1 cup corn syrup solids
17 1/2 lbs. lean elk or venison
7 1/2 lbs. fat beef trimmings
3-1/4 cups Fermento

INGREDIENTS FOR

10 LBS.

6 Tb. salt
2 tsp. Instacure No. 1
1/2 cup powdered dextrose
1 Tb. ground black pepper
1 tsp. ground ginger
6 Tb. corn syrup solids
7 lbs. lean elk or venison
3 lbs. fat beef trimmings
1-1/4 cups Fermento

GRINDING

Grind all the meat through 1/4" or 3/16" grinder plate. Place in mixer with all the ingredients and mix until the ingredients are evenly distributed. After mixing, place the meat into the curing pans, not over 6 inches high, and pack tightly. Be sure all the air pockets are removed. Let the meat cure in the cooler at 38-40° F for 3-4 days; the thuringer is properly cured when it has a nice red color. After curing, regrind all the meat through a 3/16" plate.

STUFFING

Pack meat tightly into stuffer to prevent air pockets. Stuff the meat into 2 3/4"x30" sewed single-wall beef middles; or, you may use the 3 1/2"x24" fibrous casings.

SMOKING AND COOKING

To produce a thuringer that has a consistent sour flavor, it is of the utmost importance that the correct curing and smoking temperatures are followed closely. Close attention also should be given to the weather conditions, which will govern the variations in curing and hanging time.

After stuffing, hang the thuringer on the smokehouse sticks and space properly. Allow the thuringer to hang at room

temperature for at least 10-12 hours or until the product is completely dry. If the weather is cool, increase the hanging time of the thuringer to 24 hours; that is, if the temperature is lower than 65° F.

Then place the thuringer into a 100° F smokehouse, apply a heavy smudge and smoke at this temperature for 8-10 hours. Keep the temperature between 100-110° F during this period. Then raise the smokehouse temperature to 145° F and heat at this temperature until an internal temperature of 138° F is obtained. Place in 45° F cooler and chill for at least 24 hours before using.

NOTE:

During the time the thuringer is being smoked, it is extremely important that you not exceed the maximum of 100° F.

SMOKED VENISON COUNTRY SAUSAGE

INGREDIENTS FOR 25 LBS.

20 lbs. venison
5 lbs. fat pork butts
5 cups ice water
3/4 cup salt
2-1/2 Tb. ground white pepper
1-1/4 cup corn syrup solids
3 Tb. onion powder
1 Tb. ground nutmeg
5 tsp. Instacure No. 1
2-1/2 cups soy protein concentrate

INGREDIENTS FOR 10 LBS.

6 lbs. venison
4 lbs. fat pork butts
2 cups water
5 Tb. salt
1 Tb. ground white pepper
1/2 cup corn syrup solids
4 tsp. onion powder
1 tsp. ground nutmeg
2 tsp. Instacure No. 1
1 cup soy protein concentrate

GRINDING & MIXING

Grind all meat through a 1/4" grinder plate and mix all ingredients well. Stuff into 32-35mm hog casings and link into 6" links.

SMOKING AND HEATING

Remove to preheated smokehouse at 120° F, with dampers wide open for about 1 hour or until sausage is dry. Then apply heavy smoke, gradually increasing temperature of smokehouse to 160° F. Damper is to be about 1/4 open while the smokehouse heat is increased at the rate of 10 degrees every 30 minutes. Hold until internal temperature reaches 152° F. Remove from smoker and shower with cool water until internal temperature reaches 110° F. Remove and place in cooler for 24 hours before using.

SMOKED VENISON BREAKFAST SAUSAGE

INGREDIENTS FOR

25 LBS.

5 cups water
3/4 cup salt
2-1/2 tsp. ground white pepper
2-1/2 tsp. ground ginger
2-1/2 Tb. ground nutmeg
5 Tb. powdered dextrose
2.5 Tb. sage
5 tsp. Instacure No. 1
20 lbs. lean elk or venison
5 lbs. pork or beef fat

INGREDIENTS FOR

10 LBS.

2 cups water
5 Tb. salt
1 tsp. ground white pepper
1 tsp. ground ginger
1 Tb. ground nutmeg
2 Tb. powdered dextrose
1 Tb. sage
2 tsp. Instacure No. 1
8 lbs. lean elk or venison
2 lbs. pork or beef fat

NOTE:

When freezing, it is better to omit sage from this sausage, as it makes the meat bitter when stored for long periods of time.

GRINDING

Be sure that all the trimmings are free of all blood clots, bone and skin, and that all meat has been chilled. Grind all meat through a 3/16" grinder plate into mixer. Add all the ingredients and mix well, until all the ingredients have been evenly distributed, and then stuff into a 24-26mm lamb casing.

SMOKING

After stuffing, hang all the sausage on properly placed smoke sticks. Allow the sausage to hang at room temperature for about 2 hours, then place in 110° F smokehouse and immediately apply a heavy smudge. Gradually raise the temperature to 160° F and hold until 152° F is reached internally.

If you are using beef instead of pork, you may remove the sausage from the smoker when you have reached 142° F internally. (After smoking, shower with cold tap water until the internal temperature is reduced to 110° F. Allow sausage to hang for 30 minutes until thoroughly dried, or until a desired bloom is obtained. Remove to cooler for 24 hours.

SMOKED VENISON SUMMER SAUSAGE

INGREDIENTS FOR

25 LBS.

2.5 Tb. ground black pepper
3/4 cup salt
2/3 cup powdered dextrose
5 tsp. Instacure No. 1
2-1/2 Tb. ground coriander
2-1/2 tsp. ground ginger
2-1/2 tsp. ground mustard
2-1/2 tsp. garlic powder (optional)
1 cup corn syrup solids
20 lbs. lean elk meat or venison
5 lbs. regular pork trimmings
3 1/4 cups Fermento

INGREDIENTS FOR

10 LBS.

1 Tb. ground black pepper
5 Tb. salt
4 Tb. powdered dextrose
2 tsp. Instacure No. 1
1 Tb. ground coriander
1 tsp. ground ginger
1 tsp. ground mustard
1 tsp. garlic powder (optional)
6 Tb. corn syrup solids
8 lbs. lean elk meat or venison
2 lbs. regular pork trimmings
1 1/4 cups Fermento

GRINDING

Be sure all meat has been chilled. Grind all meat through a 3/16" grinder plate. The pork fat or trimmings should be ground through a 3/4" plate or cut up in 3/4" cubes. Place all ground meat and fat trimmings into mixer and add all the ingredients. Mix well to distribute all the spices evenly. After mixing, pack into curing tubs and hold in the cooler for 2 days. Regrind meat through a 3/16" grinder plate.

STUFFING

Pack meat tightly into stuffer to omit air pockets. Summer sausage should be stuffed into 2 1/2" to 2 3/4"x24" beef middles. If not available you may use fibrous casings 3 1/2"x24".

SMOKING & COOKING

After stuffing, hang on smokesticks and dry at room temperature for 4-5 hours. Place in smokehouse preheated to 120-130° F. Apply a heavy smudge and smoke at this temperature for 3-4 hours or until the desired color is obtained.

Raise the temperature to 165° F and cook until the internal temperature reaches 145° F. After cooking, shower with

cold water until the internal temperature is at least 120° F. After shower, allow to hang at room temperature for 1-2 hours until the desired bloom is obtained. Keep out of drafts. Place in 45° F cooler for at least 24 hours.

VENISON SALAMI

INGREDIENTS FOR

25 LBS.

5 cups ice water
3/4 cup salt
5 tsp. Instacure No. 1
5 cups soy protein concentrate
2-1/2 Tb. ground white pepper
5 Tb. nutmeg
3 Tb. fresh garlic (optional)
1 cup corn syrup solids
5 Tb. powdered dextrose
20 lbs. lean elk or venison
5 lbs. pork fat (preferably back fat)

INGREDIENTS FOR

10 LBS.

2 cups ice water
5 Tb. salt
2 tsp. Instacure No. 1
2 cups soy protein concentrate
1 Tb. ground white pepper
2 Tb. nutmeg
2 large cloves fresh garlic (optional)
6 Tb. corn syrup solids
2 Tb. powdered dextrose
8 lbs. lean elk or venison
2 lbs. pork fat (preferably back fat)

GRINDING & MIXING

Be sure that all meats and trimmings are well-chilled before grinding. Grind venison or elk meat through 3/16" grinder plate and cut all the pork fat into 1" squares. Place all the meat into a mixer or tub, adding all the ice water and all other ingredients. Mix until all the ingredients are evenly distributed, then place into a 38-40° F cooler for 24 hours. The next day, remove from cooler and regrind all the meat through a 3/16" plate.

STUFFING

Venison salami should be stuffed into beef middles or a fibrous casing. When stuffing, be sure to stuff the meat tightly into the casing to eliminate all air pockets. If there are any air pockets on the surface, you may puncture them with a needle or any other sharp instrument. Place on the smokehouse sticks and space properly.

SMOKING

Place salami in the smokehouse with the drafts wide

open. Hold at 130° F for about 30 minutes or until the surface of the salami is dry. Partially close the dampers and raise the temperature to 150° F, applying the smoke at the same time. After one hour, bring temperature to 165° F and hold until the internal temperature reaches 152° F.

Remove from the smoker and place under shower until you bring down the internal temperature of the salami to about 120° F.

NOTE:

Since pork fat is being used with this salami, it is essential that an internal temperature of at least 138° F is reached in order to destroy the trichinae sometimes found in pork.

CHAPTER XI

Specialty Meat

CURING HAM

There is literally no end to the number of formulas available for the curing and smoking of ready-to-eat hams. The number could easily reach a thousand if one took the time to research this information. Various ethnic groups, farmers, thousands of meatlocker plants and many others all could give you different formulas, which most likely would confuse you. The basic curing and cooking of hams, however, is generally the same.

The types of wood or other materials one would smoke with are what make a difference. Various spices, flavors or sweeteners, such as honey, carmel, or maple sugar, also add to these distinctive flavors.

Salt is added to give the meat some flavor, and sugar is added to reduce the harshness of the salt. The sugar also gives the ham additional flavor and can contribute to its browning colors. The length of time a person wants to cure a ham can vary from 2 days to several weeks. The longer the ham is kept in the brine, the saltier the product will be. Spray pumping is preferred over brining a ham; brining a ham can take up to several weeks for the cure and flavor to penetrate the interior of the ham.

In this period of time, the bone marrow of the ham could easily spoil, especially if you are curing a ham purchased at your local meat market and you have no idea when the animal was butchered. These long brining periods also can leach the protein out of the ham and cause it to be mushy around the bone after it is smoked and cooled. There is absolutely no question that spray pumping (stitch pumping) is by far the better process. Instacure No. 1 cures the ham so fast that it can be placed into the smokehouse the next day.

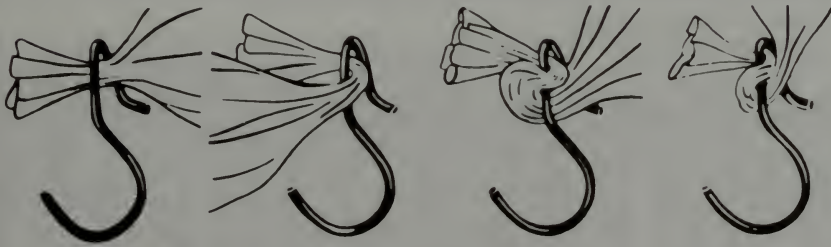
Obviously, when a ham is spray-pumped, the cures and other ingredients go to work immediately, as opposed to the slow process of penetration when brining a ham. For home use, some brining always is required, because a single needle pumping a ham will not do a complete job. The commercial processors pump their hams with gangs of needles that cover the whole ham at once, including the surface parts. Two

to three days of brining is adequate for the surface of the ham to be cured.

It is very worthwhile to note that hams in the weight range of 12-14 lbs. will generally be more tender. When buying a fresh ham (leg of pork) at your local butcher shop or market, you'll rarely see this size ham in the counter, as they are used by the big meat processors.

As mentioned earlier, the choice for making up a brine (as well as smoking the products) is up to the individual. If you know the meat was recently butchered, you may brine your hams without too much worry.

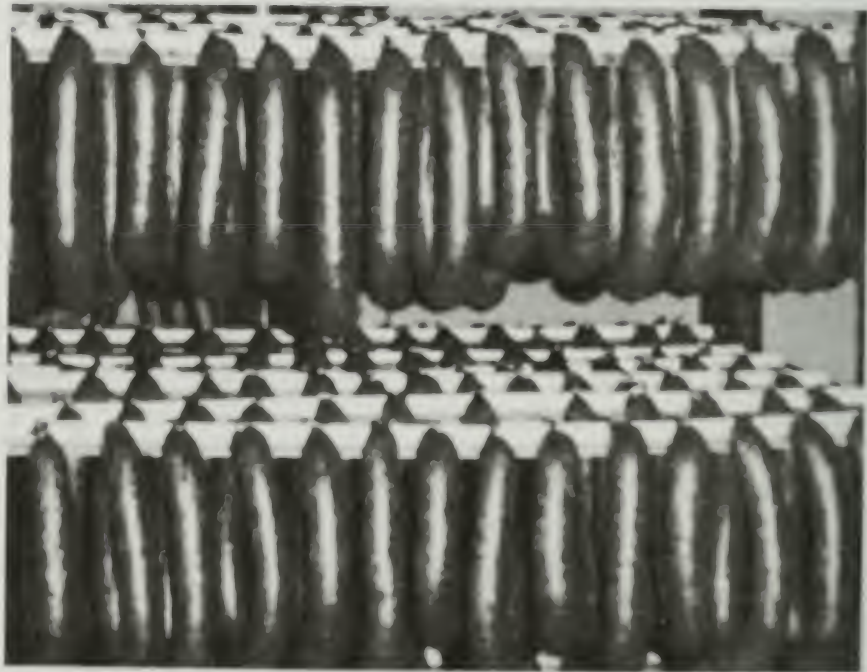
If you are going to use a stockinette to smoke your hams, be sure you soak the stockinette in vinegar or liquid smoke. The stockinette will be easier to remove after the ham is smoked and cooled.



The above photograph shows the proper way to use a stockinette hook when smoking poultry or hams. The stockinette can be washed and reused.



Properly spaced hams.



Properly spaced sausage.

SALOMETER (Brine tester)

A brine tester is an instrument that has been used for many years. At one time it was very important-you couldn't cure meat without it. However, curing meat has come a long way and there is very little use for it when following the meat-curing recipes in this book.

The amount of salt that is required to cure a piece of meat is clearly spelled out. If the salt content is too high, it is possible to lower the amount by weight. However, there are a lot of recipes in the world that do specify the use of a brine tester.

In order to use a brine tester properly, a container should be filled with water at least half or three-quarters the length of the brine tester itself. When the brine tester is placed into the water you will get a reading of 0 degrees and it will sink to the bottom.

It is only after you add salt to the water, mixing thoroughly to dissolve it, that the brine tester will start to float and you will get a reading. When you reach 50% on the scale of the brine tester, it means the water is half-saturated with salt. 100% on the scale means the water is completely saturated with salt. Any more salt added from this point on will be useless.

It is important to note that it takes a considerable amount of salt to make a brine tester float.



A salometer - for measuring the saturation of salt in a brine.

Using A Brine Tester

The formulas in *"Great Sausage Recipes and Meat Curing"* spell out the exact amount of salt that is required to cure any given piece of meat. However, there are a lot of people who have their own formulas that came to them one way or another. Lack of a scale is another reason for using a brine tester. A brine tester is used by adding salt to the water until it starts to float. It will take a considerable amount of salt to do this.



The brine testers above have been placed into a 2 1/2-gallon bucket of tap water. Without salt, it reads 0% on the scale. It will not float and sinks to the bottom (right). To the left, it shows a reading of 50%. It took about 4-5 lbs. of salt to saturate the water to this point.



The brine tester above has risen as far as it can go, or 100%. The water is now completely saturated with salt. Adding additional salt at this point is useless; the water can hold no more salt.

CONTAINERS FOR CURING MEAT

Restaurants in your area can be a good source of containers for curing meat. Many products today are packed in 5-gallon plastic buckets. Among these are peanut oil, mayonnaise and pickles, to name but a few. For the most part, the restaurant owners throw these containers into the trash after they are empty. If you can't get them free, you'll probably pay a dollar or two at the most for one. The good thing about these containers is the fact that they are made of food grade plastic. There are many grades of plastic that can give off toxic materials and are not suitable for curing meat.

When curing a ham you can make about 2 1/2 gallons of brine. (half of a 5-gallon container). When the ham is put into the container, it will displace the brine and the container almost will be filled when the ham is submerged.

BOILED HAM

The boiled ham is the most popular type of ham sold in this country-and probably the entire world. It seems as if all the European countries export a boiled ham to the USA in one form or another. Boiled hams can be purchased packed in cans, fibrous casings, or stockinettes.

The curing process itself is no different from a smoked ham. The major difference is that hams are boiled in water and not smoked, but you may add liquid smoke to the brine if you prefer a smoked flavor. The Western New York area is as famous for its "water-boiled ham" as is Virginia for "Smithfield ham," but on a smaller scale. It is unique and delicious to say the least, and not produced in other parts of the USA.

Only hams in the 12-14 lb. range are used. This in itself will give you a tender ham. The ham is tumbled in a machine that resembles a clothes dryer, but obviously larger. This tenderizes the ham even more. The ham is cured, packed into a stockinette and cooked.

In Western New York these hams are only available around the Easter and Christmas holidays and mostly by reservation, with 3-4 weeks advance notice. They are that unique. Obviously, this would be rather difficult to produce, but

a reasonably good job can be done at home using a 12-14 lb. ham and omitting the tumbling.

Canned-boiled hams cannot be duplicated at home, as it takes special equipment to press and form. A boiled ham, however, can be made at home rather easily by boning and stuffing the meat into a fibrous casing. The ham can be cured, cut into smaller chunks, dusted with plain gelatin, then stuffed into 6" or 8" diameter casings. The gelatin will help to bind the meat together so that the ham doesn't fall apart when cooled.

NOTE:

You might consider cutting off the greater part of the shank if you boil the ham in a stockinette, as it will fit a lot better into the cooking container. You might also consider cooking the ham in a smokehouse when using a fibrous casing-without smoke. There are various ways to prepare a boiled ham. It simply depends on the individual and the equipment available.

This formula is enough for about 25 lbs. of ham:

2 gals. of ice water 38-40° F.
1 lb. 12 ozs. granulated salt
1/2 cup granulated sugar
2/3 cup Instacure No. 1

All ingredients are dissolved in cold water 38-40° F. Be sure the ham is chilled to the same temperature. Weigh the amount of pickle you will be using to pump the ham to 10% of its weight. Pump the brine into the ham and place into leftover brine to cure for 5 days. Remove from brine, rinse off and cook in 160-165° F water until the internal temperature reaches 152° F (these same temperatures apply if cooking in a smokehouse). Ham is removed and placed into cold water for an hour or two until the internal temperature is reduced. Remove carefully to cooler and slice next day.

NOTE: This formula for a boiled ham is quite simple and even difficult for some people to believe. Keep in mind that pork is a highly flavorful meat and the cure helps to impart special flavors. With the salt and sugar added we have a total of 4 items going for us. You may substitute the sugar with same weight of honey if you desire.

SMOKED HAMS

INGREDIENTS FOR 100 LBS.

5-1/2 gallons ice water 38-40° F
4 lbs. salt
4 cups powdered dextrose
2-2/3 cups Instacure No. 1

INGREDIENTS FOR 25 LBS.

5 quarts ice water 38-40° F
1 lb. salt
1 cup powdered dextrose
2/3 cup Instacure No. 1

DRY-CURE METHOD ARTERY PUMPING

All ingredients are thoroughly dissolved in cold water 40° F. Hams must have an internal temperature of 38-40° F before pumping. Weigh the amount of pickle that you will be using to artery pump the ham at 10% of the weight of the ham.

After the ham is pumped, rub in 2-3 lbs. of the above dry mixture for each 50 lbs. of ham. Be sure that you have mixed the salt, sugar and cure well. The cure can cause burn spots on the meat if not evenly distributed. Avoid stacking the hams over 4 high, as this will cause excessive weight on the bottom hams, which in turn will squeeze out the natural juices and the pickle. Hams should be cured at 38-40° F for 5-7 days. Remove from the cooler and wash the surface salt off the hams with a stiff brush. DO NOT SOAK. Place in stockinettes and remove to smokehouse.

STITCH-PUMPING METHOD

Ham is pumped 10% by weight as above in dry-cure method. Ham should be pumped in the shank and around all the bones in the ham, using the same ingredients as above. Hams then are placed in a container and the cover pickle added. This pickle is the same as was used to pump the ham.

Be sure the hams are submerged beneath the pickle. Place in cooler at 38-40° F for 5-7 days. Place in stockinettes and put in smokehouse. Follow smoking instructions of following page.

PICNICS AND SHOULDERS

Pork butts and pork shoulders are, for the most part, cured exactly as a ham. However, there is one important variation. The picnics and shoulders should be pumped to 15% of their green weight, rather than the 10% for a ham. The reason for this is that during the cure period these two cuts of meat lose from 3-4% more pickle than does the ham. Otherwise, the same formula for processing ham applies to these 2 cuts of meat.

SMOKING

The hams are removed to a smokehouse preheated to 120° F. With drafts wide open, hold for 12 hours. Increase the temperature to 140° F, introducing the smoke, and hold for 8 hours with draft 1/2 open. Close the drafts, increase the temperature to 165° F and hold until the internal temperature of the ham is 142° F. For a fully cooked ham, hold until the internal temperature reaches 152-155° F.



The above photo shows a short-shank ham. The shank or hock, as it is known, is also smoked and used as a ham hock with beans, etc. Removing this shank is an especially good idea if you want to cook the ham in water after it's smoked. It is obvious that you can get by with a lot smaller cooking utensil to cook the ham in.

ITALIAN-STYLE HAM

In order to make a good Italian-style ham, the ham should be in the 12-14 lbs. range. The ham has to be pumped to 10% of its weight with a curing brine made of the following ingredients:

1 gal. water-38-40° F
1/2 cup Instacure No. 1
1-1/4 lbs. salt
3/4 cup powdered dextrose

After pumping the ham, prepare a dry rub cure according to the following formula:

2 Tb. Instacure No. 1
3 Tb. powdered dextrose
2 Tb. ground chili powder
1-1/2 Tb. garlic powder
1 lb. salt

The above mixture is enough for 50 lbs. of ham. Rub the hams well with the above mixture and place in a container to cure. The ham is held for 10 days at 35-40° F and flattened during this period. Place a clean hardwood board on top of the ham with 15-20 lbs. of weight on top of it.

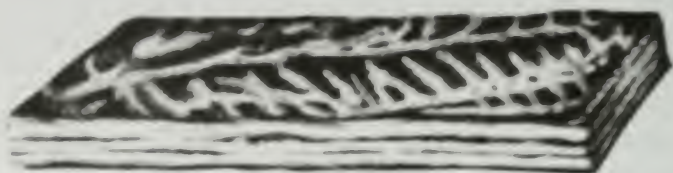
Then remove the ham and allow it to soak for at least one hour in cool water; then drip-dry for another hour. Afterward, dip the ham in the following prepared mixture:

1/2 gallon dark molasses
1/2 gallon water
3 Tb. garlic powder

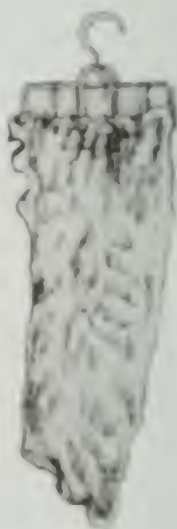
After the hams are dipped, allow them to dry at room temperature for at least 2 1/2 hours before placing in a stockinette bag. Place in a smokehouse preheated to 140° F and hold for one hour. Increase smokehouse temperature to 160° F and there until an internal temperature of 145° F is reached.

Then reduce the smokehouse temperature to 120° F and smoke the ham for 12 hours in dense smoke. Ham should

then be allowed to cool at room temperature for about 2-3 hours before it is placed in a cooler overnight.



A properly squared bacon.



The above drawings show that bacon hangers are available with 6 prongs for smaller or regular bacon, or 8 prongs for larger bacon.

HONEY-CURED BACON

1 cup salt
4 Tb. Instacure No. 1
2 cups of honey

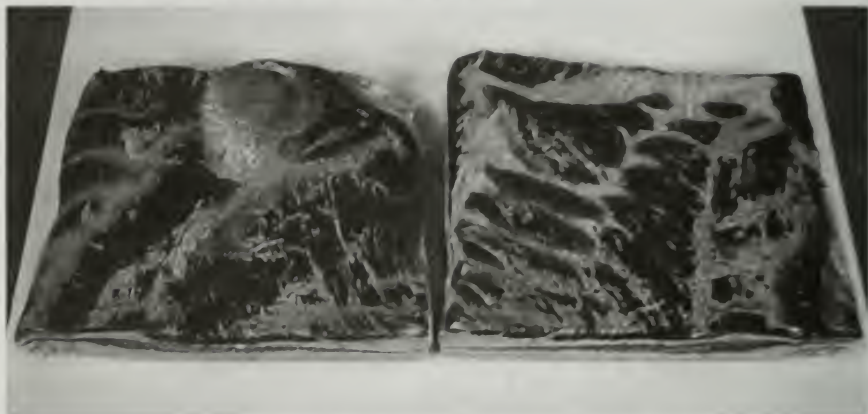
The above formula will cure about one slab of bacon. The Instacure No. 1 and the salt are mixed and then thoroughly rubbed into the bacon. After rubbing, the honey is poured on the bacon and distributed evenly. The bacon is wrapped in a good plastic-lined (freezer wrap) butcher paper and placed in a 38° F cooler for about 6 days.

The bacon then is removed from the cooler and washed very well. Excess honey and cure are washed off with lukewarm water. Let bacon dry at room temperature for about 30 minutes, then remove to smokehouse preheated to 135° F. Hold in smokehouse until bacon is dry, with dampers wide open. Dampers then are closed to 1/4 open, applying smoke, and held until internal temperature of bacon reaches 127-128° F.

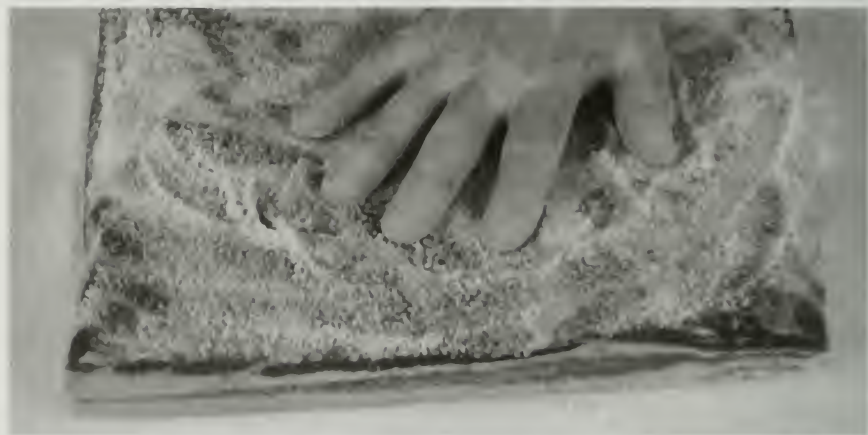
Reduce temperature of smoker to 120° F and hold until desired color is obtained. Remove and place in cooler overnight before slicing. Be sure that you are using hickory to get the desired flavor of this bacon.

This recipe for honey-cured, hickory-smoked bacon is my favorite when it comes to bacon. Not only is it an excellent bacon, but it is extremely easy to make. The instructions are just too simple to believe. It is slightly messy to prepare, but the end result only can be accomplished at home and cannot be purchased in a meat market.

Preparing A Honey-Cured Bacon At Home



The bacon is skinned and cut in half for easy handling.



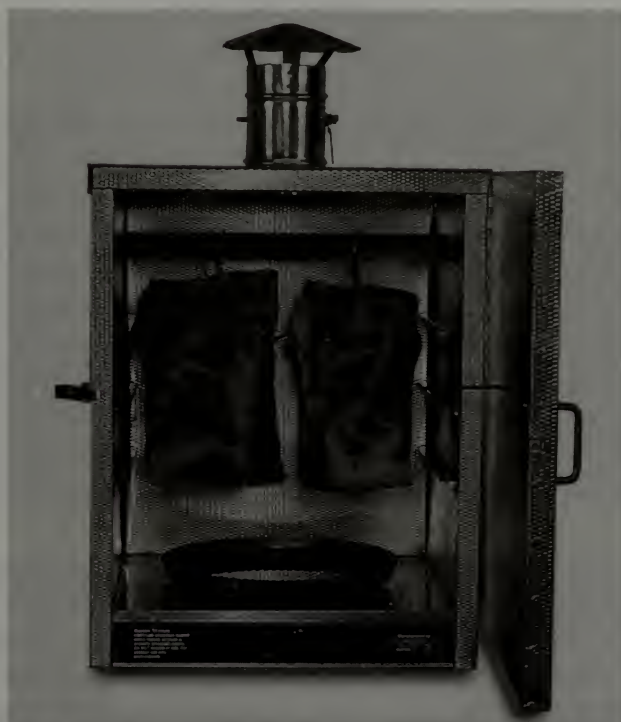
The bacon is then rubbed very well with a mixture of cure and salt.



The bacon is then generously covered with honey, placed into waiting freezer wrap and removed to the cooler for 4-5 days.



After 5 days, the bacon is washed by hand to remove excess salt, cure and honey.



The bacon is then allowed to dry at room temperature, then placed in the smoker. Follow the directions on page 317.

SPRAY INJECTION-CURED BACON

INGREDIENTS FOR

100 LBS.

5 gallons ice water 38-40° F
2 lbs. powdered dextrose
1 lb. Instacure No. 1
4 lbs. salt

INGREDIENTS FOR

25 LBS.

5 quarts ice water 38-40° F
1-1/3 cup powdered dextrose
1/3 cup Instacure No. 1
1 lb. salt

PROCESSING

Bellies should be chilled to 38-40° F before pumping. Dissolve all the ingredients in the water. Use this brine to pump 8% of the green weight of the bellies. Bellies then are placed into a container, skin side down, one on top of the other. Be sure container has a drain in the bottom to allow excess curing solution to drain out. Cover with wax paper and remove to 38-40° F cooler for 4- 5 days before smoking.

SMOKING

Bellies are removed from cooler and washed with a hot-water shower using a fiber brush. DO NOT SOAK. Remove to a smokehouse preheated to 135° F. Have dampers wide open and start smoking. After the surface of the bacon has become partially dry, close the dampers to 1/4 open and hold at 135° F until 127-128° F is obtained internally. Reduce smokehouse temperature and hold bacon until desired color is obtained. Remove to cooler and hold overnight before slicing.

NOTE:

You may lower the salt content by 1/4 of the above formula if a less salty bacon is desired.

SCHINKENSPECK

(Ham-Bacon)

INGREDIENTS FOR 25 LBS.

6-1/4 gallons ice water
1-1/3 cups salt
2-1/2 cups Instacure No. 1
1-1/4 cup powdered dextrose
1-1/4 cup ground white pepper
2/3 cup ground juniper berries

INGREDIENTS FOR 10 LBS.

2 1/2 gallons ice water
2/3 cup salt
1 cup Instacure No. 1
1/2 cup powdered dextrose
1/2 cup ground white pepper
1/4 cup ground juniper berries

Ham-bacon is rarely seen in the United States, but is readily available in many European meat markets. My first encounter with this delicious bacon was in England while serving in the armed forces.



Schinkenspeck

I ate a good deal of this bacon while in England and never did figure out what I was eating. I only knew it was much better than the American-style bacon we were served in the G.I. mess halls. We ate breakfast every chance we got in English restaurants. I would have to classify the American bacon we

are so used to as a poor man's bacon. In Europe, however, even a poor man eats ham-bacon. No question-this is the king of bacons and is far superior to our American bacon. From time to time I've been able to purchase ham-bacon in the Province of Ontario in Canada, which is across the border from Buffalo, N.Y.

As an extra fancy bacon, the Schinkenspeck requires a little extra work to produce. When finished, it will have the appearance of a rolled roast. A fresh bellie (fresh bacon) and a lean leg of pork (fresh ham) are required. Notice in the photograph that the outside of this Schinkenspeck is a bellie and the center is a lean (ham) leg of pork. Both these meats are placed in a brine made by mixing the above ingredients. Remove to cooler for 5-6 days at 40° F. After curing, this meat is allowed to drip dry before rolling into a roast.

The bacon is gently powdered with gelatin, the lean meat (ham) is placed inside it, and then the bacon is rolled around it and tied.

It is not a bad idea to smoke this ham-bacon by placing it into a small stockinette bag. When this is done, place into the smokehouse at 135° F until an internal temperature of 127°-128° F is reached. Smoke the bacon very lightly towards the end of the cycle. The smoke should be almost imperceptible.

DRY BOX BACON CURE

INGREDIENTS FOR

100 LBS.

4 cups salt
4 cups powdered dextrose
1 cup Instacure No. 1

INGREDIENTS FOR

25 LBS.

1 cup salt
1 cup powdered dextrose
1/4 cup Instacure No. 1

PROCESSING

All the ingredients are to be mixed very well until they are all evenly distributed. The bellies should be refrigerated at 38-40° F before use and trimmed nicely (squared off). Each belly then is thoroughly rubbed and placed into the box, meat side up. Pack the bellies tightly one on top of the other after they are rubbed and be sure that all the air pockets are omitted.

After 2 days, the bellies should be covered in their own natural brine. If not, make a pickle brine using 1-1/4 lbs. of the above formula to 1 gallon of water.

Bellies should be cured on the basis of 1 lb. per day (10 lb. belly-10 days). Be sure you do not leave in cure more than 13 days, 3 days past the 10-day limit.

Remove from the curing box and wash the bacon, removing the surface salt. DO NOT SOAK; place in the smokehouse, preheated at 135° F with dampers wide open. Hold at this temperature until the surface of the bacon is dry. Close dampers to 1/4 open, apply smoke, and hold this temperature until an internal temperature of 127-128° F is obtained. Reduce smokehouse temperature to 120° F and hold until desired color is obtained. Remove to 36-38° F cooler overnight before slicing.

CANADIAN-STYLE BACON

INGREDIENTS FOR

100 LBS.

5 gallons ice water 38-40° F
4-1/2 cups powdered dextrose
1 cup Instacure No. 1
3 cups salt

INGREDIENTS FOR

25 LBS.

5 quarts ice water 38-40° F
1 cup 2 Tb. powdered dextrose
1/4 cup Instacure No. 1
3/4 cup salt

MEAT

Chill pork loins to 38-40° F; the average weight is 12-14 lbs. Remove all the bones, being very careful not to damage any of the meat. Trim down all the fat until you reach the lean meat.

PROCESSING

Dissolve all the ingredients in cold water. If needed, you may add ice to bring down the temperature of the water. After the brine is made, the loins should be spray pumped to 10% of their green weight. Loins then are placed into the leftover brine and placed in cooler for 4-6 days at 38-40° F. Remove from the cooler and wash under a shower of hot water. Let drain and stuff very tightly into a synthetic casing. You may pin-prick all the air pockets to let entrapped air escape.

SMOKING

Place into preheated smokehouse at 130° F with dampers wide open; hold for 4 hours without smoke. Gradually increase temperature to 150° F and close damper to 1/4 open; hold for 3 hours, introducing the smoke. Increase temperature to 160° F and hold until the internal temperature reaches 142° F. Remove from the smoker and cool with cold tap water until the internal temperature is reduced to 110° F. Let hang at room temperature until casings are dry. Remove to cooler overnight before using.

NOTE:

If you are using small loins, you may rub both pieces of the loin on the lean sides with a fine- granulated gelatin. This will help to bind the two pieces that are stuffed into the casing after they are cooled off.

PEAMEAL BACON

Peameal bacon is another form of Canadian bacon, except that it is cured but not smoked. This bacon is found widely in the Canadian meat markets, especially in the province of Ontario. The pork loins are cured the same way as Canadian bacon. After curing, the loins are dried somewhat and coated generously with yellow corn meal. They are then sliced and fried. If you wish, you may coat both sides of sliced bacon before frying.



Canadian bacon



Peameal bacon

BEEF BACON

INGREDIENTS FOR 100 LBS.

5 gallons ice water 38-40° F
6 cups salt
4 cups powdered dextrose
1-1/3 cups Instacure No. 1

INGREDIENTS FOR 25 LBS.

5 quarts ice water 38-40° F
1-1/2 cups salt
1 cup powdered dextrose
1/3 cup Instacure No. 1

MEAT

Beef plates

PROCESSING

Beef plates are cured in brine made from the above formula. Plates are cured for 7-8 days and overhauled on the fourth day. After the plates are cured, they are washed with hot water, and all the loose surface fat is removed. Bacon is then hung-properly spaced.

SMOKING

Bacon is removed to a smokehouse preheated to 135° F, with the drafts wide open until the surface of the product is dry. Dampers are closed to 1/4 open starting the smoke; hold until the desired color is obtained. The drafts are closed and smoke shut off; temperature is raised to 160° F and bacon is held until an internal temperature of 135° F is obtained. Shut off heat and let remain in smokehouse for at least 1 hour. Remove to cooler overnight before slicing.

BEEF BACON (DRY CURE METHOD)

Beef bacon generally is cured the same as pork bacon. The only difference is the beef bacon is cured for 6-7 days rather than on the basis of 1 lb. per day.

PASTRAMI

INGREDIENTS FOR 100 LBS.

5 gallons ice cold water 38-40° F
2-1/2 cups Instacure No. 1
4 Tb. garlic juice
3 cups salt
4 cups powdered dextrose

INGREDIENTS FOR 25 LBS.

5 quarts ice cold water 38-40° F
2/3 cup Instacure No. 1
1 Tb. garlic juice
3/4 cup salt
1 cup powdered dextrose

MEAT

Use a very good grade of beef plates or well-trimmed briskets.

PUMPING & CURING

Pump the plates or briskets to 15% of their weight. Meat should be placed in curing box or vat and kept submerged while curing in cooler for 3-5 days at 40° F.

SPICING & SMOKING

Remove the cured pastrami pieces from the box or vat and rub all sides with a combination of coarse black pepper and coriander; or you may use coarsely chopped pickling spices. You also may sprinkle the meat with paprika to give it an attractive appearance.

Place in smokehouse preheated at 130° F with dampers wide open. Hold at this temperature for about 1 hour or until the surface of the meat is dry. Close dampers to 1/4 open and apply a light smoke for about 2 hours. Gradually increase the smokehouse temperature to 200-220° F and hold until an internal temperature of 175-180° F is obtained. Meat then is removed from the smokehouse and allowed to cool at room temperature for 1-2 hours before removing to cooler overnight.

KOSHER STYLE CORNED BEEF BRISKETS

INGREDIENTS FOR

100 LBS.

(for pump and cover pickle)

5 gallons ice water 38-40° F

3 cups salt

1-1/2 cups Instacure No. 1

2 cups powdered dextrose

2 cups pickling spice

INGREDIENTS FOR

25 LBS.

(for pump and cover pickle)

5 quarts ice water 38-40° F

3/4 cup salt

1/3 cup Instacure No. 1

1/2 cup powdered dextrose

1/2 cup pickling spice

PROCESSING

The briskets are to be spray-pumped to about 12-15% of their green weight. After pumping, the briskets are packed in a vat, flesh side up, and sprinkled with whole pickling spice. The next layer then is packed flesh side down, continuing to pack, flesh to flesh, with the spices in between, until the vat is full. Add enough of the brine until the vat is full. Place cover on top and be sure all the meat is covered with brine.

CURING

Allow briskets to cure in a 38-40° F cooler for 3-4 days. Brisket then is ready to use.

NOTE:

You may use beef rounds if briskets are not available. Beef rounds would require a longer curing time, simply because of the difference in thickness of the meat. Slicing a beef round into 2 inch thickness would not require additional curing time.

Curing Corned Beef At Home

Nothing is better and easier to cure than a corned beef. Almost anyone can do it as it takes a minimum of time and equipment.



Briskets are best for making corned beef, but you can also use beef rounds. The meat is cut into smaller pieces to fit into the container.



The meat is then placed into a container of prepared brine and placed into a cooler for 4-5 days. I always add a handful or so of a good grade of pickling spices. This really gives it a special flavor.

SMOKED BACK RIBS

Back ribs, or more correctly pork loin ribs, are the end result after the loin is removed and usually turned into Canadian or peameal bacon. The rib end of this pork loin usually cut off. Only the center ribs and loin end are used as back ribs.

During the separation of the loin from the ribs (or boning, if you will) a substantial amount of meat deliberately is left on these ribs. The following formula is enough for about 25 lbs. of back ribs:

2-1/2 gallons cold water
1 lb. salt
1-1/2 cups powdered dextrose
1/2 cup instacure No. 1

The ingredients are mixed with the water until completely dissolved. Place back ribs into brine and remove to refrigerator for 2 days. Remove from cooler, hang on hooks, and allow to drip-dry at room temperature for about 1 hour. Place in a preheated smokehouse at 120° F with dampers wide open to allow further drying. When ribs are dry to the touch, increase smokehouse temperature to 160° F. Apply heavy smoke and hold for 3-4 hours until ribs are a golden brown. Remove and let cool at room temperature for 1 hour before placing into cooler overnight.

CURED AND SMOKED BEEF TONGUES

INGREDIENTS FOR 10 LBS.

2-1/2 gallons water

1 lb. salt

1 cup Instacure No. 1

Beef tongues are to be washed until free of slime. Tongue is then pumped with brine up to about 5% of its weight. It is then placed into pickle to cure for about 8 days. When curing more than one tongue, you must overhaul tongues at the end of the 4th day.

Tongues are removed, washed clean and placed into a stockinette. Keep tongues at room temperature for about 4 hours while smokehouse is preheating to 140° F. Meat is placed in smokehouse with dampers wide open to allow drying of the tongues. Raise temperature to 180° F and hold for at least 4-5 hours depending on size. Tongue should be firm to the touch before removal from smoker. Remove to room temperature until internal temperature is reduced to 110° F. Place in cooler overnight before using.

PEPPERED BEEF ROUNDS

INGREDIENTS FOR 10 LBS.

2-1/2 gallons ice water
1 cup Instacure No. 1
1 lb. salt
2 lbs. powdered dextrose

Use pieces of top or bottom rounds, about 4-5" thick. Meat is pumped with brine, 10% of the weight of the meat. The meat then is generously rubbed with the cracked black pepper and laid down in aging container very tightly, with a weighted wooden cover to press meat down. Add just enough brine to cover the meat and let it age for 7 days at 38-40° F.

Meat is removed and placed into a stockinette. Meat also can be laid flat if smokehouse screen is available. The smokehouse should be preheated to 130° F with dampers wide open, until the surface of the meat is dry. Temperature then is raised to 155° F with damper about 1/4 open. Meat is smoked at this temperature for 4 hours. Smoke then is shut off and temperature raised to 210° F until the internal temperature of the meat is 165° F. Meat is then placed in cooler for 24 hours before slicing.

SLONINA PAPRYKOWANA **(Polish-Style Paprika Salt Pork)**

1/2 cup Instacure No. 1
2-1/2 lbs. salt
Paprika

Bacon (with the skin removed) is cut in half, lengthwise. Using the above mixture, rub the bacon pieces well. Lay the bacon in a bed of salt; each piece thereafter should also be covered with salt. Then place the bacon in a cooler for 6-7 days. After this, re-rub the bacon and place in the salt again as done previously.

After 1 more week, remove the bacon from the cooler and wash thoroughly with luke-warm water. Cut the bacon into pieces 10-12" long and dry for 2-3 hours. Rub the bacon with a good grade of paprika, allowing as much to adhere as possible. You may dredge the bacon in paprika. Tap it, allowing the excess paprika to fall off.

Place the bacon in a smokehouse at 70-75° F and smoke for 24 hours until it has a brick- red color. Remove and store in cooler.

NOTE:

This bacon should be treated as raw meat.

SALT PORK

The above process may be followed for salt pork, omitting the paprika and the smoking step. In addition, backfat is very popular in the U.S. when making salt pork. Salt pork can be stored in the salt and cure mixture until ready to use after the 2-week period of curing is over.

CAPICOLA - FULLY COOKED

INGREDIENTS FOR

100 LBS.

5 gallons ice water 38-40° F
4-1/2 cups powdered dextrose
1 cup Instacure No. 1
3 cups salt

INGREDIENTS FOR

25 LBS.

5 quarts ice water 38-40° F
1 cup, 2 Tb. powdered dextrose
4 Tb. Instacure No. 1
3/4 cup salt

MEAT

Use lean boneless pork butts, ranging from 3-4 lbs. Be sure butts are chilled to 38-40° F before using.

PROCESSING

Dissolve all the ingredients in 5 gallons of water at 38-40° F; if needed, add ice to bring water temperature down. Mix the ingredients well until they are all dissolved in the water. After brine is made, all the pork butts should be spray pumped to 10% of the green weight. A 4 lb. pork butt should be pumped with 6-7 ozs. of brine. Pump brine on all sides of the butt.

Pork butts should then be placed into the brine and left for 3 days at 38-40° F cooler. After 3 days, remove butts from brine and spray-wash with cool water and let drain. Butts are then rubbed with Spanish paprika and ground red pepper. Amount of pepper to be rubbed is of individual preference. Butts then are stuffed into beef bungs or synthetic casings. After stuffing, the casings must be pin-pricked to allow entrapped air to escape. Hang properly spaced on smoke sticks.

SMOKING

Remove butts to smokehouse preheated to 130° F with the dampers wide open for 3 hours. Increase the temperature to 150° F and hold for 2 hours with dampers 1/4 open, applying a light smoke. Raise temperature to 160-165° F and hold

until an internal temperature of 152° F is obtained. Remove from smokehouse, dipping butts into hot boiling water momentarily to shrink the casing. Let hang at room temperature until 110° F is obtained internally. Remove to 45° F cooler overnight.

SMOKED BONELESS BUTTS

A smoked boneless butt generally is processed the same way as the capicola. The same cure mix may be used, and curing time in cooler is 3-6 days. Omit paprika and red pepper rub. Stockinettes are to be used instead of casings, and a heavier smoke is applied.

DRIED BEEF

INGREDIENTS FOR 10 LBS.

2 1/2 gallons ice water
1 cup Instacure No. 1
1-1/2 cups salt
1-1/2 cups powdered dextrose

PROCESSING PROCEDURE

Use a beef round that is completely free of fat. The meat and brine both should be chilled around 38° F. Pump the beef very carefully with the brine, not exceeding 8% of the weight of the meat. Be careful not to overpump one area in order to avoid creating air pockets in the meat.

The meat then is placed in the curing pickle for 10 days. After curing, the meat is removed and allowed to soak in the tap water for several hours, changing the water every hour.

Meat is removed, allowed to drain and placed in stockinette. Hang meat in a smokehouse preheated to 100° F for 12 hours to dry. Drafts should be wide open. Temperature then is raised to 115° F and held for 24 more hours with draft 1/2 open. Temperature then is increased to about 125° F for 12 hours with smoke. Temperature is then reduced to 115° F. Shut off smoke and hold until meat shrinks to about 35% of its original weight. Dried beef is sliced paper thin.

DRIED BEEF

For good dried beef you must select a firm piece of meat, properly trimmed. Remove all fat and sinew. When curing more than one piece, the meat generally should be trimmed to equal sizes.

5 GALLON FORMULA

5 gals. water
1 lb. Instacure No. 1
1-1/2 lbs. salt
1 lb. cane sugar

Add ingredients to the water and mix thoroughly. Be sure the water is at 38-40° F. Pump the beef with this brine using no more than 8% of the meat's weight. Care should be taken not to pump too much brine into the meat, because it can cause air pockets. Pump the brine into the center of the beef, pulling the needle out as you are pumping the brine. Place meat in the remaining brine for 12-14 days.

After the meat is cured, let it soak in water for about 1 hour. The water should be changed once or twice during this period. Let the meat drip dry and place it in a stockinette bag. The following drying and smoking schedule is recommended:

HOURS	TEMPERATURE	
10 at	100-110° F	No smoke
12 at	100-110° F	With smoke
6 at	120° F	No smoke
7 at	130° F	No smoke

It is important that the above temperatures are adhered to, especially during the first 22 hours. It is during this time that drying too fast can form a crust on the surface of the meat, which won't allow the remaining moisture to escape.

After 35 hours at the above temperatures reduce the smokehouse temperature to 115° F. Keep the meat there for about 4 days without smoke. The product will shrink about 35-40% but will still have about 50% of its original moisture. The meat should be allowed to cool gradually in the smoker

without heat or at room temperature for about 5-6 hours.
Place in cooler.

CURING & SMOKING POULTRY

As with other meats, poultry must first be cured before smoking.

Almost all poultry that is shipped into a butcher shop is packed in ice. This is done to prolong its relatively short shelf life-about 7-10 days. Since most butcher coolers are kept at 38- 40° F, the shelf life of poultry is dramatically shortened.

From the day the poultry is butchered until it reaches the supermarket, it can be 2-3 days in transit, packed in ice at about 32° F. Any temperatures higher than that causes the poultry to spoil. Three to four days on the road and a week in someone's refrigerator, and the poultry is spoiled. The shelf life for fresh beef, pork or veal is at least twice as long-and at higher temperatures.

In other words, poultry should either be cooked up in a day or two or frozen. I think it becomes quite clear why we only see frozen turkeys in the butcher shop, and this really makes it hard to tell how old the poultry is. It's risky to use a store-bought turkey for curing and smoking.

You can spray-pump the cure into the turkey or poultry right to the meat and let it brine soak for only a couple of days instead of the usual 4-5 days. This puts the odds in your favor. If you raise and butcher your own turkeys or poultry, you probably will not have these problems.



Notice how the above smoked turkey holds its shape after hanging in a smoker for a number of hours. The stockinette bag was used to give the turkey this nice shape.



The chicken above was smoked without the use of a stockinette bag. It looks like it is ready to fly. Stockinette bags do enhance the appearance of smoked poultry.

SMOKED TURKEY

INGREDIENTS

5 gallons water
1 1/2 lbs. powdered dextrose
2 lbs. salt
1 lb. Instacure No. 1

A maple-flavored sugar may be used in place of the powdered dextrose called for in the above formula to give the bird an unusual flavor. This formula can be used for all poultry.

COVER PICKLE METHOD

Dissolve all the ingredients in water chilled to 38-40° F. Wash the cavity of the turkey very well and have the temperature of the turkey at 38-40° F before placing into the brine. Turkey should be submerged in brine for at least 4 days at 38-40° F . A larger turkey will take about 5 days to cure.

SPRAY-PUMP METHOD

Dissolve all the ingredients in water chilled to 38-40° F. Pump the turkey with curing solution using 10 percent of the weight of the turkey (20 lb. turkey -pump with 2 lbs. of brine). After pumping, place the turkey in ice-cold water for at least 3 hours. Remove the turkey from the ice-cold water and place in cover pickle at 38-40° F. Remove to cooler at 38-40° F and allow to cure for 48 hours.

SMOKING

After turkey is cured, wash very well with cold water and place into a preheated smoker at 130° F. Smoke at this temperature for at least 1 hour with damper wide open. Close damper to 1/4 open and apply smoke for 5 hours at 130° F; raise temperature to 140° F and hold for 4 hours.

Finally, raise temperature to 165° F and hold until an internal temperature of 160° F is obtained. Use a dial meat thermometer, inserting the stem close to the ball-and-socket joint of the thigh, as this seems to be the last place the meat becomes thoroughly cooked. Remove from smoker and let

the meat temperature drop to about 100° F before placing into the cooler.

SMOKED TURKEY IS A PERISHABLE PRODUCT AND SHOULD BE KEPT UNDER REFRIGERATION AT ALL TIMES.

NOTE:

Sodium nitrite in the curing solution will cause the meat of the turkey to turn pink when it is smoked. If this color is objectionable, you may omit this cure from the formula.

If you decide not to use cure in your brine, it is imperative that you preheat your smoker to at least 180° F and allow the turkey to dry for at least one hour. The temperature should then be raised to 200° F and cooked until the internal temperature is at least 170° F. Needless to say, we are now baking or cooking the turkey at more or less normal high temperatures, which eliminates the possibility of food poisoning without the use of cures.

Insert the thermometer in the thickest parts of the breast, as close to the center as possible. The turkey leg, in the thickest part, is also a good place to check as well.

I always have preferred to use cures when smoking poultry. First, I find that cures definitely enhance the flavor of the turkey or chicken.

Second, smoking cured poultry at low temperatures allows you to do a much better job of smoking. Using lower temperatures also prevents a great deal of shrinkage, which is important commercially. The profits are not going up the chimney and the poultry is not dried out. Try both processes to see which one you prefer.

CHAPTER XII

Cured Sausage

Semi-Dry

SEMI-DRY SAUSAGE

Fermentation is the key to making high quality semi-dry sausage with the traditional tangy flavors. These tangy flavors are produced by a specific bacteria that is added to the meat by chance during the handling of the meat, or by deliberately adding a known starter culture as part of the formula. The latter method is more desirable, as we can control fermentation and produce a consistent product.

Even though semi-dry sausages were being produced for centuries before AD, very little was known about what was actually happening inside these sausages. There was no real control of the fermentation and the flavors varied from batch to batch.

About all that was known for sure was the fact that specific amounts of salt and dextrose were needed to help the fermentation with spices for flavor. Somewhere, someone decided to save some meat from the previous batch and add it to the new batch, etc. This is called "back slopping" and was done to get a more consistent flavor or develop some control each time these sausages were made. It was a start in the right direction, but still not controlled fermentation.

Back slopping was started after the 1850s when Louis Pasteur concluded his experiments with fermentation. It was then realized that a bacteriological culture was helping to produce these tangy flavors in semi-dry sausages. An accumulation of fermentation products caused these tangy flavors, of which lactic acid is predominant. We began to find out that dextrose is food for the lactic acid organism to feed on.

For best results, 12 ounces of dextrose per 100 lbs. of meat is required to obtain optimum growth of this lactic acid organism. Dextrose is not intensely sweet and is, therefore, used instead of sugar. It supports the fermentation better than sugar or other sweeteners.

The amount of salt also is very important in the production of semi-dry sausage. Salt is not only a spice that contributes flavors to semi-dry sausages; it also helps to select the right organisms for fermentation and prevents the growth of undesirable organisms as well.



A humidity indicator (hygrometer)-a must if you are going to dry cure meat or sausage.

HUMIDITY

It seems strange indeed that maintaining a high relative humidity is an important step in the process of dry-curing a salami or other meat. Most people think it should be the other way around; the lower the humidity, the quicker we can dry cure the product.

The dry curing process requires controlled humidity and temperatures to support the fermentation process. A proper level of humidity helps to maintain a proper moisture balance that will give us optimum growth of the lactic acid organism, in order to produce the tangy flavor required. On the other hand, too high a humidity can result in the development of undesirable molds. Humidity that is too low can cause dehydration on the surface of the sausage and cause "case hardening."

Put another way, it simply means overdrying the sausage on the exterior too quickly. This overdrying actually forms a hard ring on the outside of the sausage. This condition will not allow the rest of the moisture to escape from the center of the sausage being drycured. Once the sausage or salami is case hardened, it would be like stuffing meat into an iron pipe and welding it shut at both ends. Nothing can get in and nothing can get out.

It is quite easy to distinguish a case-hardened product. You will see a grey ring around some reddish meat when it is sliced. Therefore, it is important to maintain the proper humidity and correct temperatures in order to attain a properly cured product.

After the product is mixed, recipes call for various holding periods at various temperatures. Other formulas allow for the meat to be stuffed and held at various temperatures. In either case, the greatest acid production in the dry-cure process comes at temperatures of 100- 110° F. The length of time the product is held depends entirely on the product in question and the tang desired. It can vary from a low of 4 hours to beyond 24 hours.

The last part of this process is to stop the fermentation after we have reached the desired tang. This is simply done by heating the product until the internal temperature of the product reaches anywhere from 138-150° F.

SODIUM ACETATE AND RELATIVE HUMIDITY

Making a dry-cured or semi-dry cured sausage can be a difficult undertaking if you live in a desert climate or any other part of the country that has a consistently low relative humidity. Living near large bodies of water, like the oceans or lakes, is no guarantee of high humidity - it can be erratic from day to day. Obviously, it would be better if we could semi-dry cure or dry-cure sausage under controlled consistent conditions.

A great number of recipes in this book call for various percentages of humidity for good reasons. **You do not dry-cure or semi-dry cure a sausage by placing it behind a warm stove or in your attic.** A more likely spot is a damp cellar, if you have one. You have to be able to maintain a high humidity in order to produce these products properly.

Fortunately, Charles L. Jean of Glendale, Arizona has helped us solve the problems of dry-curing meat in low-humidity areas. A chemist, Mr. Jean advised me how he overcame this problem, since he limits his sausage making to the dry-cured or semi-dry cured products. In an area (Arizona) that rarely has a relative humidity reading beyond 15%, this is quite a feat, and he has requested that I pass along this information to all other sausage makers like himself.

Mr. Jean constructed a sealed Plexiglas container and made a saturated solution with sodium acetate crystals in the bottom of the Plexiglas container. This will maintain a constant humidity of 75% while at room temperature or a refrigerated temperature. Seventy-five percent is an ideal humidity for dry-cured or semi-dry-cured sausage or meat.

In other words, Mr. Jean more or less constructed a sort of smoker, but to be used solely for curing sausage. It should contain some type of smokehouse sticks on which to hang the sausage. This container should be of a size that can fit in a refrigerator, since the temperatures to be maintained are usually on the cool side 50-60° F. The possibility of using a second refrigerator and putting a pan of a sodium acetate solution in it is appealing, because with almost no work and just the expense of an extra refrigerator, you can solve the humid-

ity problem.

There are other, less expensive materials one might want to try. Plain wood that is lined with a heavy gauge plastic would also do. There are also materials like sheet metal (galvanized or stainless). Even acrylic or epoxy paints that are used to make aquariums at home can be used.

Probably the most important factor in creating humidity is using a food-grade sodium acetate. There are also commercial grades of sodium acetate not recommended for use around food. The foodgrade sodium acetate is more commonly used as a buffering agent with other pharmaceuticals.

Through research we found that there is even a cheaper way to produce humidity for dry curing sausage at home. If you have an old refrigerator available, place one pound of regular table salt onto a cookie sheet with a lip around it or a plastic storage container about 10x12. Spread the salt evenly on the sheet, add just enough water to barely cover the salt. Place this sheet or container on the bottom of your refrigerator. This will give a humidity level of about 70%. Add water as needed over the time that the sausage is dry curing. A hygrometer is definitely needed when checking humidity levels.

This method of creating humidity is also recommended when using a frost free refrigerator for any type of curing method. As a frost free refrigerator removes moisture from the air, so it would be advisable to use this method to create humidity and to check the humidity level frequently to avoid over drying your product.

AIR DRYING COOKED SAUSAGE

You may come across a recipe telling you to grind the meat and then let it dry by being spread out on a table overnight. This is supposed to remove some of its moisture. Clearly, this is a bad practice and should be avoided, as you would be adding all types of bacteria and losing all control in the type of finished product you want to get. It is even worse from a practice of sanitation and would never be permitted in a sausage kitchen that is inspected by a health department.

It is quite clear that making a semi-dry or dry-cured sausage has its limitations as to what area of the country it can be made in. The desert areas of the southwest clearly are very bad for these processes, as the humidity is dramatically low all year long. On the other hand, the Great Lakes region and other areas near large bodies of water have exceptionally high humidity all year long, along with the cooler temperatures that are required. These types of sausage should be made during the cooler seasons of the year.

It also is important to note that these types of sausages are made commercially all year long, using air-conditioned rooms. This also can be accomplished at home by using a confined area, like an extra refrigerator, in which one could control the temperature as well as the moisture.

FERMENTO

Fermento is a dairybased, controlled fermentation product in powdered form.

Fermento imparts a tangy flavor and may be used in the manufacture of all fermented-type sausages similar to summer sausage, thuringer, pepperoni, etc. This assists in the making of fermented-type sausage at home as well as the smaller commercial sausage kitchens. Fermento should only be used in the production of semi-dry products.

The recommended usage levels are 1-6 percent, depending on the flavor desired. However, 3 percent generally is the accepted level to start with. If you desire more tang in the product, you may go as high as 6 percent as mentioned above. It is important that you do not go beyond 6 percent, as it can cause the sausage to break down and become mushy. You may use less than 3 percent if you desire less tang. The uses referred to are only a guideline and the user should determine the suitability of this product for each product that is made.

DRYING SAUSAGE

The object of drying a sausage is to gradually and constantly extract the moisture from its interior. The periods of time could range from 30 days to 6 months. Refrigeration or air conditioning plays a very important part in the drying of these sausages. Making this type of sausage always was limited to the colder seasons of the year.

Since these dry or semi-dry sausages came into demand at all times of the year it prompted the introduction of mechanically controlled rooms.

Even making this sausage in the colder seasons, rather than under controlled conditions, makes it extremely difficult to produce a uniform product, since the drying room is affected by the outside weather conditions. You can vary the temperatures and relative humidity in a sausage-drying room, depending on the product itself. Dry sausage is processed by a combination of curing and drying which assures its safety for eating without further processing or cooking.

DESTROYING TRICHINAE

I think it is important to note that of the 10 or 12 sausage-making books circulating in the U.S., a number of them have attempted to explain that trichinae in pork can simply be destroyed by freezing. Unfortunately, it really is not that simple, but then these authors know nothing about this process, or what it takes to get the job done. Needless to say, it is a case of very bad research and people writing about a subject they know nothing about. Because they have never worked on or studied this subject, it just isn't possible for them to know where to research this information. They simply omitted this very critical information on how to destroy trichinae by freezing when preparing pork. Simply freezing pork will not destroy trichinae.

U.S.D.A. specifications, are very detailed as to what it takes to destroy trichinae by freezing. You must follow these instructions to the letter. Not doing so can cause sickness. See page 40 for article on destroying Trichinae.

BEAR MEAT

As a precautionary note to hunters, it is imperative to let you know that bear meat more often than not is infected with the trichinae parasite. Bear meat must be processed the same as any pork product when it's used in sausage making or meat curing and smoking.

The following government regulations are recognized as adequate to destroy the live trichinae that are sometimes found in fresh pork by the Meat Inspection Service of the United States Department of Agriculture:

GOVERNMENT REGULATIONS FOR CURING DRY OR SEMI-DRY SAUSAGE

Dry and semi-dry sausages usually are eaten by the consumer without further cooking, yet they are not heated during processing to an internal temperature which assures destruction of live trichinae in pork flesh, the parasite that causes trichinosis in humans.

As a safety measure to guard against trichinosis, the Meat Inspection Division (MID) of the United States Department of Agriculture has established processing regulations in the treatment of pork with regard to sausage making.

Sausage may be stuffed into animal casings, hydrocellulose casings, or cloth bags. If animal casings are used, according to government regulation, it is permissible to use potassium sorbate only to retard mold on dry sausages (salam-i type). Use a water solution containing 2.5% potassium sorbate; it may be applied to casings after stuffing, or casings may be dipped in the solution prior to stuffing.

DRY CURING

In the preparation of sausage, one of the following methods may be used.

METHOD NO. 1. - The meat shall be ground or chopped into pieces not exceeding 3/4" diameter. A dry-curing mixture containing not less than 3-1/3 lbs. of salt per each 100 lbs. of unstuffed sausage is thoroughly mixed with the ground or chopped meat.

After being stuffed, sausage having a diameter not exceeding 3-1/2", measured at the time of stuffing, shall be held in a drying room not less than 20 days at a temperature not lower than 45° F, except that in sausage known as pepperoni, if in casings not exceeding 1-3/8" in diameter at time of stuffing, the period of drying may be reduced to 15 days. However, the sausage should not be released from the drying room in less than 25 days from the time the curing materials are added, except that sausage known as pepperoni, if in casings not exceeding the size specified, may be released at the expiration of 20 days from the time the curing materials are added.

Sausage in casing exceeding 3-1/2", but not exceeding 4" in diameter at time of stuffing, must be held in a drying room not less than 35 days at a temperature not lower than 45° F, and in no case should the sausage be released from the drying room in fewer than 40 days from the time the curing materials are added to the meat.

METHOD NO. 2. - The meat is ground or chopped into pieces not exceeding 3/4" in diameter. A dry-curing mixture containing not less than 3-1/3 lbs. of salt per 100 lbs. of unstuffed sausage is thoroughly mixed with the ground or chopped meat. After being stuffed, the sausage having a diameter not exceeding 3-1/2", measured at the time of stuffing, must be smoked not less than 40 hours at a temperature not lower than 80° F, and finally held in a drying room for at least not less than 10 days at a temperature not lower than 45° F.

The sausage must not be released from the drying room in less than 18 days from the time the curing materials are added to the meat. Sausage exceeding 3-1/2", but not exceeding 4", in diameter at the time of stuffing, must be held in a drying room, following smoking as above indicated, not less than 25 days at a temperature not lower than 45° F, and in no case shall the sausage be released from the drying room in less than 33 days from the time the curing materials are added to the meat.

METHOD NO. 3. - The meat is ground or chopped into pieces not exceeding 3/4" in diameter. A dry-curing mixture containing not less than 3-1/3 lbs. of salt per each 100 lbs. of the unstuffed sausage is thoroughly mixed with the ground or chopped meat. After mixing with the salt and other curing materials and before stuffing, the ground or chopped meat shall be held at a temperature not lower than 34° F for at least 36 hours.

After being stuffed, the sausage shall be held at a temperature not lower than 34° F for an additional period of time sufficient to make a total of not less than 144 hours from the time the curing materials are added to the meat, or the sausage shall be held for the time specified in a pickle-curing medium of not less than 50° strength (salinometer rating) at a temperature not lower than 44° F.

Finally, the sausage having a diameter not exceeding 3-1/2", measured at the time of stuffing, shall be smoked for not less than 12 hours. The temperature of the smokehouse during this period at no time shall be lower than 90° F; and for 4 consecutive hours of this period the smokehouse shall be maintained at a temperature not lower than 128° F.

Sausage exceeding 3-1/2", but not exceeding 4" in diameter at the time of stuffing, shall be smoked, following the prescribed curing, for not less than 15 hours. The temperature of the smokehouse during the 15-hour period shall at no time be lower than 90° F, and for 7 consecutive hours of this period the smokehouse shall be maintained at a temperature not lower than 128° F. In regulating the temperature of the smokehouse for the treatment of sausage under this method, the tempera-

ture of 128° F should be attained gradually during a period of not less than 4 hours.

METHOD NO. 4 - The meat shall be ground or chopped into pieces not exceeding 1/4" in diameter. A dry-curing mixture containing not less than 2-1/2 lbs. of salt per each 100 lbs. of the unstuffed sausage is thoroughly mixed with the ground or chopped meat. After mixing with the salt and other curing materials and before stuffing, the ground or chopped sausage shall be stuffed in casing or cloth bags not exceeding 3-1/2" in diameter, measured at the time of stuffing.

After being stuffed, the sausage shall be held in a drying room at a temperature not lower than 45° F for the remainder of a 35-day period, measured from the time the curing materials are added to the meat. At any time after stuffing, if a concern deems it desirable, the product may be heated in a water bath for a period not to exceed 3 hours at a temperature not lower than 85° F, or subjected to smoking at a temperature not lower than 85° F, or subjected to smoking at a temperature not lower than 80° F, or the product may be both heated and smoked as specified.

The time consumed in heating and smoking, however, shall be additional to the 35-day holding period specified.

METHOD NO. 5 - The meat shall be ground or chopped into pieces not exceeding 3/4" in diameter. A dry-curing mixture containing not less than 3-1/3 lbs. of salt per each 100 lbs. of the unstuffed sausage shall be thoroughly mixed with the ground or chopped meat. After being stuffed, the sausage is held for not less than 65 days at a temperature not lower than 45° F. The covering for sausage prepared according to this method may be coated at any stage of the preparation before or during the holding period with paraffin or another substance approved by the Director of the Meat Inspection Division, USDA.

FREEZING - Freezing under specified conditions for times and temperatures also will destroy live trichinae in pork tissue. See the MID regulations for freezing pork on page 40.

The stuffing of the meats into the casings can be very significant; the casings should be packed as tightly as possible

and the artificial fibrous casings will do the job best. Pack the stuffer tightly to eliminate all the air pockets or hollow spots. If the spaces or air pockets are allowed to develop in the interior of the sausage, mold may form and ruin the sausage.

Mold once was considered necessary and desirable in the making of a dry sausage; however, it has been proven that in a mechanically controlled dry room an excellent quality sausage can be produced while preventing or minimizing mold.

In the processing of dry sausage, moisture can only be removed from the product at the rate at which the moisture comes to the surface of the casing. Any attempt to speed up the drying rate results in overdrying the surface of the sausage, resulting in case hardening. On the other hand, if the sausage is dried at too low a rate, excessive mold occurs on the surface of the casing, leading to an unsatisfactory appearance on the casing.

Dry sausage is made in different varieties, generally uncooked, and its keeping qualities depend on the curing ingredients, spices and removal of moisture from the sausage by drying. In general, there are two distinct types of sausage; one variety being smoked, the other not smoked.

FROZEN STARTER CULTURES

A starter culture has been developed in recent years that dramatically speeds up the process of drying or fermenting dry and semi-dry sausages. The traditional process for a semi-dry sausage ranges from 100-140 hours; the newly developed starter cultures have reduced the process to 8-24 hours, allowing a very uniform product each time the sausage is made.

When the manufacturers produce these starter culture cells, they use a flash-freezing process and store these cells at -15° F. The culture is packed in 4 oz. and 6 oz. cans and used at the rate of 2 ozs. per one hundred pounds of meat. The problem of shipping this starter culture to the sausage manufacturers was overcome by packing the culture in dry ice and flying this material to its destination.

For the most part, these particular starter cultures are not for home use. To begin with, the home- type freezers seldom attain a temperature of below -15° F. The manufacturers undoubtedly have a minimum quantity that must be purchased, which usually is beyond our reach. Also, the process is completely different, even though the manufacturer does supply the new processing scheduled.

If a person was interested in the use of this starter culture, the best place to inquire about it would be at a sausage company that manufactures these type sausages in your general area. You would have to be prepared to use this starter culture quickly, since it can spoil if kept too long at above -15° F. The organisms must be kept frozen until 30-60 minutes before use. The shelf life of this starter culture is 6 months at -15° F.

It only has been since 1957 that we have been able to control fermentation in dry or semi-dry sausages. The American Meat Institute developed a process of producing a lactic starter culture that now is being made by the Merck Chemical Company. This product goes under the trade name of "Accel" and not only guarantees consistent flavors, but also shortens processing time dramatically.

SAUSAGE DRYING ROOMS

Air conditioning a room has become a very important part of dry curing sausage or meat on a year-round basis. The object is to produce or remove humidity and regulate temperature as well. It has been found the product is most favorably processed in a drying room at 45-55° F with a humidity of 70-72%. Dry sausage is made in many varieties and generally is uncooked. Its keeping qualities depend on the curing ingredients (Instacure 2), salt, spices, and the removal of moisture from the product being dry cured.

Under good conditions, a moisture removal of 30-35% is considered a fully-dried product; this could take from 60-75 days. Of course, the diameter of the product is important in processing a dry cured sausage.

When curing dry and semi-dry sausages, they should be spaced apart on 6" centers. The length of time the sausage is dry cured depends upon the diameter of sausage being cured and the various formulas followed. The individual formulas can have a variance from 2-10 days, depending on the individual sausage maker. When in doubt, refer to "Government Regulations for Curing Dry or Semi- Dry Sausage".

Most varieties of dry-cured sausages are not smoked. If smoked meat is preferred, you may smoke salami or meat after it is cured in a cold smoker, without heat. Smoking will add to preserving quality, as acids in the smoke will discourage unwanted bacteria growth during storage. To further minimize bacteria levels prior to stuffing, the natural or fibrous casings may be soaked in vinegar or liquid smoke to prevent mold.

SUMMER SAUSAGE (Goteborg)

INGREDIENTS FOR 25 LBS.

5 tsp. Instacure No. 1
2-1/2 Tb. black pepper
1/2 cup ground mustard
5 Tb. ground nutmeg
2-1/2 tsp. garlic powder (optional)
1 cup salt
2/3 cup powdered dextrose
3-3/4 cups Fermento
9-1/2 lbs. beef trimmings
5 lbs. beef chuck
5 lbs. beef hearts
5-1/2 lbs. pork trimmings

INGREDIENTS FOR 10 LBS.

2 tsp. Instacure No. 1
1 Tb. black pepper
3 Tb. ground mustard
2 Tb. ground nutmeg
1 tsp. garlic powder (optional)
1/3 cup salt
4 Tb. powdered dextrose
1-1/2 cup Fermento
3-1/2 lbs. beef trimmings
2 lbs. beef chuck
2 lbs. beef hearts
2-1/2 lbs. pork trimmings

GRINDING

The beef trimmings should be ground through a 3/16" grinder plate. The regular pork trimmings should be ground through a 3/4" plate. Place all the ground meat into mixer and add all the ingredients. Mix thoroughly until all the ingredients are distributed. After mixing, place in a tub and hold in 38-40° F cooler until the next day. Do not pack the meat over 6"-7" high in the tubs. After curing overnight, regrind through 1/8" plate, pack tightly in stuffer and stuff into 2-1/2 to 2-3/4" by 24" sewed beef middles or 3-1/2" x 24" fibrous casings. Be sure that all air pockets are eliminated- when stuffing, stuff tightly.

SMOKING & COOKING

After stuffing, hang on smokesticks and dry at room temperature for 4-5 hours. Place in smokehouse preheated at 120-130° F and apply a heavy smudge and smoke at this temperature for 3-4 hours, or until the desired color is obtained. Raise the temperature to 165° F and cook until the internal temperature reaches 145° F. After cooking, shower with cold water until the internal temperature is at least 120° F. After shower, allow to hang at room temperature for 1-2

hours until the desired bloom is obtained. Keep out of drafts. Place in 45° F cooler for at least 24 hours.

DRIED SAUSAGE STICKS (SLIM JIMS)

INGREDIENTS FOR 25 LBS.

5 tsp. Instacure No. 1
2/3 cup paprika
1 cup ground mustard
2-1/2 tsp. ground black pepper
2-1/2 tsp. ground white pepper
2-1/2 tsp. ground celery
2-1/2 Tb. mace
1 Tb. granulated garlic
3/4 cup salt
3/4 cup powdered dextrose
3-3/4 cups Fermento

INGREDIENTS FOR 10 LBS.

2 tsp. Instacure No. 1
4 Tb. paprika
1/3 cup ground mustard
1 tsp. ground black pepper
1 tsp. ground white pepper
1 tsp. ground celery
1 Tb. mace
1 tsp. granulated garlic
5 Tb. salt
4-1/2 Tb. powdered dextrose
1-1/2 cups Fermento

MEAT

Dried sausage sticks are made using a fairly lean type of meat. You may use any kind of cow, bull or steer meat. The ratio is about 80% lean and 20% fat. Beef chuck is excellent meat for this sausage.

PROCESSING PROCEDURE

Meat is chilled at 30-32° F so that it will not smear when being ground through a 3/16" grinder plate. It is then mixed well for about 2 minutes and stuffed into 22-24mm sheep casings. Desired length is 6"-9". Meat is then placed in a smokehouse at 98-110°F, with cold smoke applied for about 8 hours. If you desire more tang you may hold this temperature for 12 more hours. Smokehouse temperatures are then raised until internal temperature reaches 145° F. Remove from smoker and place in dry room at 50-55° F.

Option - add 1 tsp. cayenne pepper for added spice to 10 lb recipe. Store in glass or plastic jar with holes on top of cover to allow some air circulation, sticks will get moldy if stored in plastic bags, with a twist tie.

LEBANON BOLOGNA

10 Lb. Recipe

A good Lebanon bologna is made of 100% beef chuck or lean beef trimmings. The meat is ground through a 1/2" grinder plate and mixed with 4 ozs. of salt. The meat is then aged for 5-6 days at 38-40° F allowing all the juice to run off. The meat is then ground through 3/16" plate and mixed with the following ingredients:

- 2 Tb. salt
- 2 tsp. Instacure No. 2
- 8 Tb. corn syrup solids
- 3 Tb. powdered dextrose
- 1 1/3 cup Fermento
- 1 Tb. ground white pepper
- 1 Tb. ground nutmeg
- 1 Tb. paprika
- 1 tsp. onion powder

The ingredients are then mixed with the meat and stuffed into 5" by 24" protein-lined casing. Bologna is then placed into smokehouse as follows:

- 16 hours at 90° F - 90% humidity
- 28 hours at 105° F - 85% humidity
- 6 hours at 110° F - 85% humidity

During these 50 hours, the bologna is going to develop a tang that makes it unique in flavor. Bologna then can be heavily smoked a day or two without heat. If you want a fully cooked product, raise the smokehouse temperature to 150° F after 50 hours. Then hold until internal temperature reaches 137° F . Bologna is then removed from smokehouse and allowed to cool until the internal temperature is 110° F. It is then placed into a cooler and allowed to age for about 4-5 days before using.

THURINGER

INGREDIENTS FOR

25 LBS.

1 cup salt
5 tsp. Instacure No. 1
2/3 cup powdered dextrose
2-1/2 Tb. ground black pepper
2-1/2 tsp. ground ginger
2-1/2 Tb. whole or cracked
black pepper
3-3/4 cups Fermento
10 lbs. lean pork trimmings
or skinned fatted shoulders
5 lbs. pork butts
5 lbs. pork hearts
5 lbs. pork fat

INGREDIENTS FOR

10 LBS.

6 Tb. salt
2 tsp. Instacure No. 1
4 Tb. powdered dextrose
1 Tb. ground black pepper
1 tsp. ground ginger
1 Tb. whole or cracked
black pepper
1-1/2 cups Fermento
4 lbs. lean pork trimmings
or skinned fatted shoulders
2 lbs. pork butts
2 lbs. pork hearts
2 lbs. pork fat

GRINDING

Grind the lean pork, pork cheeks and pork hearts through a 3/16" grinder plate. Cut the pork cheeks or pork fat into 1 1/2"-2" cubes. Place all the meats into the mixer along with all the ingredients and mix well. Put meat in curing tubs and pack tightly to eliminate the air pockets. Place in a 38-40° F cooler for 3-4 days. The thuringer is properly cured when it has a nice red color. After curing, remove from the cooler and grind through a 1/8" or 3/16" plate.

STUFFING

Pack the meat very tightly into the stuffer, eliminating all air pockets. Use single-wall beef middles for stuffing, 2-3/4" x 30" long or 3 1/2"x24" fibrous casings.

SMOKING AND COOKING

To produce a thuringer that has a consistent sour flavor, it is important that correct curing and smoking temperatures are followed very closely. Close attention also should be given to the weather conditions which will govern the variations in curing and hanging time. After stuffing, hang thuringer on smoke

sticks and allow to hang at room temperature 65-70° F for 10-12 hours or until the product is thoroughly dry. When the weather is cooler than 65° F, increase the hanging time to 24 hours. Place thuringer into 100-110° F smokehouse. Immediately apply a heavy smudge and smoke at this temperature for 8-10 hours; raise the smokehouse temperature to 145° F and smoke at this temperature until internal temperature of 138° F is reached. Allow to cool at room temperature and place into cooler overnight.

NOTE:

It is very important that the thuringer be smoked at a low temperature; maximum temperatures should not exceed 110° F.

CERVELAT SUMMER SAUSAGE

INGREDIENTS FOR

25 LBS.

2-1/2 Tb. ground black pepper
1 cup salt
2/3 cup powdered dextrose
2-1/2 Tb. ground coriander
2-1/2 Tb. ground mustard
5 tsp. Instacure No. 1
2-1/2 tsp. garlic powder (optional)
3-3/4 cups Fermento
9 lbs. beef or cow meat
5 lbs. beef chuck
5 lbs. beef hearts
6 lbs. fat pork butts

INGREDIENTS FOR

10 LBS.

1 Tb. ground black pepper
6 Tb. salt
4 Tb. powdered dextrose
1 Tb. ground coriander
1 Tb. ground mustard
2 tsp. Instacure No. 1
1 tsp. garlic powder (optional)
1-1/2 cup Fermento
3-1/2 lbs. beef or cow meat
2 lbs. beef chuck
2 lbs. beef hearts
2-1/2 lbs. fat pork butts

GRINDING

Grind bull or cow meat, beef cheeks and beef hearts through a 3/16" grinder plate. The regular pork trimmings or fat should be ground through a 3/4" plate or cut up in 3/4" cubes. Place all the ingredients and meats into the mixer until everything is mixed thoroughly. After mixing, place all the meat into curing tubs, packing the meat down tightly. Hold in a 38-40° F cooler for 2 days. After curing, regrind all the meat through a 1/8" plate.

STUFFING

Pack the meat into the stuffer very tightly to exclude the air pockets. Meat is to be stuffed into sewed beef middles 2 1/2"-2 3/4" x 24" long. You may use a 3-1/2" x 24" fibrous casing, if beef middles are not available.

SMOKING & COOKING

After stuffing, hang on smokehouse sticks and dry at room temperature for about 4-5 hours. Place into 120-130° F smokehouse and apply a heavy smudge, smoking at this temperature for 3-4 hours or until the desired color is obtained.

Raise the smokehouse temperature to 160- 170° F and hold until an internal temperature of 145° F is obtained. Remove from smokehouse, place under a shower of tap water and hold until temperature is reduced to 120° F internally. Permit sausage to hang at room temperature for 1-2 hours or until a desired bloom is obtained. Be sure the room is free of drafts during this period of blooming.

SEMI-DRY KIELBASA MYSLIWSKA SUCHA

INGREDIENTS FOR

25 LBS.

20 lbs. lean pork
5 lbs. lean beef
1 cup salt
5 Tb. powdered dextrose
4 Tb. corn syrup solids
5 tsp. Instacure No. 1
5 Tb. ground black pepper
2-1/2 tsp. ground juniper berries
5 garlic cloves granulated

INGREDIENTS FOR

10 LBS.

8 lbs. lean pork
2 lbs. lean beef
6 Tb. salt
2 Tb. powdered dextrose
1-1/2 Tb. corn syrup solids
2 tsp. Instacure No. 1
2 Tb. ground black pepper
1 tsp. ground juniper berries
2 garlic cloves granulated

Grind the pork through a 3/4" grinder plate and the beef through a 1/2" grinder plate. Grind all fat meat through a 1/4" or 3/16" grinder plate. Add the remaining ingredients to the meat and mix thoroughly until evenly distributed.

Stuff the mixture into 35-38mm hog casings and form long links 8-10". Dry the sausage at room temperature for 3 hours before placing in a smokehouse preheated to 120° F for 1 hour, applying dense smoke. Then increase the temperature to 168° F, until the internal temperature reaches 158° F. Let the sausage air-cool at 50-60° F. The next day, smoke the sausage for 24 hours without heat. Place the sausage in a storage room at 60-65° F for 7 days with a relative humidity of 70-80%. You will achieve a 35-40% weight loss when the sausage is ready.

SEMI-DRY CURED KIELBASA KUJAWSKA PUDSUSZANA

INGREDIENTS FOR

25 LBS.

20 lbs. ham or shoulder
2-1/2 lbs. lean beef
2-1/2 lbs. fresh bacon
3/4 cup salt
5 tsp Instacure No. 1
1/2 cup ground black pepper
2-1/2 Tb. ground paprika
2-1/2 garlic cloves granulated
6 Tb. powdered dextrose
4 Tb. corn syrup solids

INGREDIENTS FOR

10 LBS

8 lbs.ham or shoulder
1 lb. lean beef
1 lb. fresh bacon
5 Tb. salt
2 tsp.Instacure No. 1
3 Tb.ground black pepper
1 Tb.ground paprika
1 garlic cloves granulated
2-1/4 Tb. powdered dextrose
1-1/2 Tb.corn syrup solids

Grind fat meat and bacon through a 1/2" grinder plate. Grind the lean meat through a 3/8" grinder plate. Add the remaining ingredients to the meat and mix thoroughly. Stuff the mixture into a 35-38mm hog casing and form into 5-6" links. Place on smokesticks and keep at room temperature for 3 hours. Place sausage in a preheated smokehouse at 120° F until it starts to get a light brown color. At this point, increase the smokehouse temperature to 170° F, applying a dense smoke. Keep the sausage at this temperature until you reach 158°F internally. Place the sausage in a cooler and cool overnight. The next day, remove the sausage from the cooler and keep at room temperature for about 1 hour. Then place it in a smoker preheated to 110° F, applying dense smoke for 12 hours. Air-dry the sausage for 3 days at 60-70° F with a relative humidity of 70-80%. You will achieve a 15% weight loss by the time product is ready to use.

SEMI-DRY BALTIC POLISH SAUSAGE

(Kielbasa Baltycka)

INGREDIENTS FOR 25 LBS.

15 lbs. pork
7-1/2 lbs. beef
2-1/2 lbs. fresh bacon
3/4 cup salt
5 tsp. Instacure No. 1
6 Tb. powdered dextrose
4 Tb. corn syrup solids
2-1/2 Tb. ground black pepper
2-1/2 Tb. ground marjoram
2-1/2 Tb. garlic

INGREDIENTS FOR 10 LBS.

6 lbs. pork
3 lbs. beef
1 lb. fresh bacon
5 Tb. salt
2 tsp. Instacure No. 1
2-1/4 Tb. powdered dextrose
1-1/2 Tb. corn syrup solids
1 Tb. ground black pepper
1 Tb. ground marjoram
1 Tb. garlic

Grind lean meat through a 3/8" grinder plate and the fat meat through a 1/8" or 3/16" grinder plate. The bacon should be chilled to about 28° F, and ground through a 3/8" grinder plate, then returned to the cooler until ready for use.

Add the remaining ingredients (except the bacon) and mix thoroughly until evenly distributed. Then add the cold bacon and mix gently. Stuff the mixture into a hog bung or a protein-lined, fibrous 3 1/2" x 24" casing and keep at 45-50° F for 12 hours. Then place the sausage into a smoker preheated to 120° F and keep there for 2 to 2-1/2 hours until a brown color starts to show. Increase the smokehouse temperature to 170° F and maintain until the internal temperature of the sausage reaches 158° F. Then remove the sausage from the smoker and air cool at 60-70° F overnight. The next day, smoke the sausage again for 48 hours more without heat or until it has a very dark brown color.

After smoking, keep the sausage at 65° F for about 10-12 days with a relative humidity of 70-80%. When a weight loss of 18-20% is achieved, the sausage is ready. The sausage should be kept in a 40-50° F cooler while obtaining the weight loss.

SEMI-DRY CURED POLISH KRAKOW SAUSAGE (Kielbasa Krakowska Sucha)

INGREDIENTS FOR 25 LBS.

20 lbs. lean pork butts
4 lbs. fresh bacon
1 lb. lean beef
3/4 cup salt
5 tsp. Instacure No. 1
2-1/2 Tb. ground nutmeg
3 large cloves garlic granulated
2/3 cup powdered dextrose
6 Tb. corn syrup solids

INGREDIENTS FOR 10 LBS.

8 lbs. lean pork butts
1-1/2 lbs. fresh bacon
1/2 lb. lean beef
5 Tb. salt
2 tsp. Instacure No. 1
1 Tb. ground nutmeg
1 large clove garlic granulated
4 Tb. powdered dextrose
2-1/2 Tb. corn syrup solids

The bacon should be cut into 1/2" cubes and place in a 28° F cooler until it is ready to be used. Grind the pork through a 1/2" grinder plate and the fat meat through a 1/8" or 3/16" grinder plate.

Chop the garlic very fine and place in a blender with a little water. Add the remaining ingredients and mix thoroughly. Add the cubes of bacon and mix until evenly distributed. The mixture is then stuffed into a protein-lined, fibrous 3-1/2" x 24" casing or a sewed beef middle. Hang the sausage at room temperature for 5 hours, then place in a smokehouse preheated to 130° F, applying a dense smoke. After one hour, increase the temperature to 165-170° F and maintain until an internal temperature of 158° F is reached. Remove from smoker and cool at room temperature for at least 12 hours. The next day, smoke the sausage for 24 hours without heat, preferably at a temperature below 85° F. When completed, the dark brown color of the bacon will be visible through the casing.

Dry the sausage for 12-14 days at 50-60° F with a relative humidity of 70-80%. This drying period will produce a weight loss of about 33%.

SEMI-DRY KABANOSY

Kabanosy sausage can be compared to the American-style slim jims one sees in convenience stores and bar rooms throughout the country.

INGREDIENTS FOR

25 LBS.

25 lbs. pork butts
3/4 cup salt
5 tsp. Instacure No. 1
1/2 cup powdered dextrose
1/2 cup ground black pepper
2-1/2 Tb. ground nutmeg
2-1/2 Tb. ground caraway seed
3 cloves garlic granulated
1/2 cup corn syrup solids

INGREDIENTS FOR

10 LBS.

10 lbs. pork butts
5 Tb. salt
2 tsp. Instacure No. 1
3 Tb. powdered dextrose
3 Tb. ground black pepper
1 Tb. ground nutmeg
1 Tb. ground caraway seed
1 clove garlic granulated
3 1/2 Tb. corn syrup solids

Grind lean pork through a 1/4" grinder plate and fat pork through a 1/8" or 3/16" grinder plate. Add remaining ingredients and mix thoroughly. Stuff mixture into 24-26mm sheep casings and form 5-6" links. Place on smokesticks and hang at room temperature for 2 hours. Place sausage into a smoker preheated to 140° F, applying a dense smoke.

After one hour, increase temperature to 190° F for 30 minutes. Kabanosy should have a dark brown color when finished. Remove sausage from smoker and cure for 7 days at 60-65° F with a relative humidity of 70-80%. Sausage is ready when weight is reduced by 50%.

SEMI-DRY CURED UKRANIAN SUMMER SAUSAGE (Kiebase Ukrainska Podsuszana)

INGREDIENTS FOR

25 LBS.

17 1/2 lbs. lean beef
7 1/2 lbs. pork butts
3/4 cup salt
5 tsp. Instacure No. 1
2-1/2 Tb. paprika
2-1/2 Tb. whole pepper
2-1/2 tsp. ground marjoram
1-1/2 Tb. garlic
2/3 cup corn syrup solids
1 cup powdered dextrose
1-3/4 cup Fermento

INGREDIENTS FOR

10 LBS.

7 1/2 lbs. lean beef
2 1/2 lbs. pork butts
5 Tb. salt
2 tsp. Instacure No. 1
1 Tb. paprika
1 Tb. whole pepper
1 tsp. ground marjoram
2 small garlic cloves *granulated*
4 Tb. corn syrup solids
6 Tb. powdered dextrose
3/4 cup Fermento

Grind pork through a 1/4" grinder plate and beef through a 3/8" grinder plate. Add remaining ingredients and mix until evenly distributed. Stuff mixture into either 38-40mm or 40-43mm beef rounds. The casings are usually filled to about 15-18" long, leaving at least 3-4" on each end. Then tie the casings, resulting in a round ring of sausage. Place the sausage on a smokestick and hang at room temperature 65-70° F for about 3 hours. This will allow the sausage to dry while its temperature rises. Put the sausage in a preheated smokehouse at 165° F, applying a dense smoke for 2 hours. After smoking, cook the sausage in the smoker until you reach an internal temperature of 152° F. Remove the sausage from the smoker and cool overnight without refrigeration at 60-70° F. Put the sausage in the smoker at 90° F for 12 more hours in a dense smoke. The result will be a reddish-brown sausage.

The sausage should then be allowed to air-dry at 50-60° F with a relative humidity of 70- 75%. The sausage is ready to eat when you achieve shrinkage is about 15%.

SEMI-DRY POLISH MOUNTAIN SAUSAGE **(Kielbasa Podhalanska Podszyszana)**

INGREDIENTS FOR

25 LBS.

15 lbs. lean lamb
2-1/2 lbs. smoked bacon
7-1/2 lbs. fat pork meat
3/4 cup salt
5 tsp. Instacure No. 1
1/2 cup ground black pepper
2-1/2 Tb. whole black pepper
1-1/2 tsp. ground marjoram
5 garlic cloves granulated
1/3 cup powdered dextrose
1-3/4 cup Fermento

INGREDIENTS FOR

10 LBS.

7 lbs. lean lamb
1 lb. smoked bacon
2 lbs. fat pork meat
5 Tb. salt
2 tsp. Instacure No. 1
3 Tb. ground black pepper
1 Tb. whole black pepper
1/2 tsp. ground marjoram
2 garlic cloves granulated
2-1/4 Tb. powdered dextrose
3/4 cup Fermento

Grind fat pork and bacon through a 1/2" grinder plate. Grind sheep meat through a 3/4" grinder plate. Combine the meat with the remaining ingredients and mix until thoroughly distributed. Stuff the mixture into 32-35mm hog casings, making 8-10" long links. Then put the links on smokesticks and hang at room temperature 65-70° F for about 3 hours. By this time, the sausage will be fully dried. Place in a smokehouse and keep at about 110° F until they show a light brown color. Then raise the smokehouse temperature to 160-165° F and cook the sausage until you reach an internal temperature of 150° F. Then remove the sausage from the smoker and cool for 24 hours. After this time, a second smoking process takes place. The sausage is placed in the smokehouse again for 12 hours, applying a cold smoke (no heat). Then remove the sausage and dry in 75-80% humidity with a temperature of 50-60° F. The sausage must be allowed to shrink at least 15% before it is ready to use.

SHEBOYGAN SUMMER SAUSAGE

The Sheboygan summer sausage is distinguished more by the type of meat used to make it than by the spices with which it is seasoned. However, they do work hand-in-hand to make it unique.

INGREDIENTS FOR 25 LBS.

15 lbs. beef chuck
3-3/4 lbs. pork hearts
6-1/4 lbs. pork butts
1 cup salt
5 tsp. Instacure No. 1
3 tsp. garlic powder
2-1/2 cups Fermento
1 cup powdered dextrose
3/4 cup corn syrup solids
2-1/2 tsp ground black pepper
2-1/2 tsp ground mustard seed
2-1/2 tsp ground nutmeg

INGREDIENTS FOR 10 LBS.

5 1/2 lbs. beef chuck
1 1/2 lbs. pork hearts
3 lbs. pork butts
1/3 cup salt
2 tsp. Instacure No. 1
1 tsp. garlic powder
1 cup Fermento
6 Tb. powdered dextrose
5 Tb. corn syrup solids
1 tsp. ground black pepper
1 tsp. ground mustard seed
1 tsp. ground nutmeg

Grind beef, chuck and pork hearts through a 3/16" grinder plate. Grind pork butts through a 1/2" grinder plate. Add all ingredients to meat mixture and blend thoroughly until evenly distributed. Then place the mixture into a 38-40° F cooler for at least 48 hours. Pack the meat tightly in a container not more than 6" high, eliminating all air pockets.

After this period of time, remove the meat from the cooler and grind through a 1/4" grinder plate. Then stuff it into a 3 1/2" x 24" protein-lined fibrous casing. Allow the sausage to dry and cure at room temperature for 3 hours.

Sausage is then placed in a preheated smokehouse at 90° F and kept there in heavy smoke for about 24 hours, or until a dark color is reached. Then increase the smoker temperature to 130° F for 4 hours and then 4 more hours at 150° F, or until the internal temperature reaches 138-140° F. Be sure to check the internal temperatures of several sausages from different parts of the smokehouse to ensure these temperatures have been attained.

Shower the sausage to reduce the internal temperature to 90-95° F and store at 60-65° F.

SPANISH CERVELAT SAUSAGE (SALCHION)

INGREDIENTS FOR

25 LBS.

17-1/2 lbs. lean pork butts
5 lbs. lean beef
2-1/2 lbs. cured backfat
1 cup salt
5 tsp. Instacure No. 1
1/2 cup corn syrup solids
3/4 cup powdered dextrose
2-1/2 tsp. whole black pepper
2-1/2 tsp. ground nutmeg
4 Tb. ground mustard seed
3-3/4 cup Fermento

INGREDIENTS FOR

10 LBS.

7 lbs. lean pork butts
2 lbs. lean beef
1 lb. cured backfat
6 Tb. salt
2 tsp. Instacure No. 1
3-1/2 Tb. corn syrup solids
5-1/4 Tb. powdered dextrose
1 tsp. whole black pepper
1 tsp. ground nutmeg
1-1/2 Tb. ground mustard seed
1-1/2 cup Fermento

Grind beef through a 3/16" grinder plate and the pork butts through a 3/16" or 1/4" grinder plate. Dice the cured backfat into 1/2" cubes and keep in the cooler at about 28-30° F for later use.

All the meat (except backfat) should be mixed well with all the other ingredients, then packed tightly into pans not more than 6" high. Be sure meat is packed very well to eliminate the air pockets. Place meat into a cooler at 38-40° F and keep there for 48 hours.

Remove meat and grind through a 3/16" grinder plate. At this time, gently mix the diced backfat with the meat until distributed. Stuff meat into hog bungs or a 3-1/2" x 24" protein-lined casing. Hang the stuffed sausage in a cooler at 45° F for 36 hours. Allow the sausage to hang overnight at room temperature 65-70° F until it develops a nice red color on the outside. Place sausage in a preheated smokehouse at 110° F, holding it there for 24 hours while applying a heavy, dense smoke. The temperature of the smokehouse should then be increased to 150° F and maintained until the sausage reaches an internal temperature of 138° F. Then hang the sausage for several days at 50-60° F before storing in cooler at 40-45° F.

DANISH SUMMER SAUSAGE (SPEGEPOELSE)

INGREDIENTS FOR

25 LBS.

6 lbs. pork hearts
12 lbs. lean beef
7 lbs. pork snouts
5 tsp. Instacure No. 1
1/2 cup corn syrup solids
3/4 cup powdered dextrose
3-3/4 cups Fermento
1 cup salt
1/3 cup ground coriander
2/3 cup ground mustard

INGREDIENTS FOR

10 LBS.

2 lbs. pork hearts
6 lbs. lean beef
*2 lbs. pork snouts
2 tsp. Instacure No. 1
3-1/2 Tb. corn syrup solids
5-1/4 Tb. powdered dextrose
1-1/2 cup Fermento
1/3 cup salt
2-1/2 Tb. ground coriander
4 Tb. ground mustard

**If you have difficulty in obtaining pork snouts, you may substitute pork butts.*

All the beef and pork hearts should be ground through a 3/16" grinder plate. Grind pork snouts through a 1/2" grinder plate. Then add all the ingredients to meat and mix well until evenly distributed.

Pack the meat mixture tightly into pans, removing all air pockets. Do not pack meat over 6" high in pans.

Place the meat in a 38-40° F cooler and keep there for 48 hours. Regrind the meat through a 3/16" grinder plate and stuff into a 3-1/2" x 24" protein-lined casing. Allow sausage to dry at room temperature for at least 3 hours. Place in pre-heated smokehouse at 90° F applying heavy smoke for 12-18 hours.

After this time, the temperature in the smokehouse should be raised 10 degrees every hour until you reach 150° F. Keep sausage at this temperature until you reach an internal temperature of 140° F. Hang sausage at room temperature for 48 more hours, then place in a cooler at 38- 40° F for storage.

TRAIL BOLOGNA

Country-style or trail bologna, as it is sometimes called, is a bologna made with coarse cuts of meat. In the early days of sausage making there were no emulsifying machines and most of the meat was cut by hand. At best, there were grinders. Country-style bologna is made by grinding the fat meat through a 1/8" or 3/16" grinder plate. The lean meat is ground through a 1/4" or 3/8" grinder plate. The coarseness of the meat depends on the person making the bologna.

INGREDIENTS FOR

25 LBS.

15 lbs. lean beef
10 lbs. pork
5 tsp. Instacure No. 1
5 Tb. ground white pepper
2-1/2 Tb. paprika
2-1/2 Tb. ground nutmeg
2-1/2 Tb. allspice
2-1/2 Tb. onion powder
3/4 cup salt
1/3 cup powdered dextrose
1/4 cup corn syrup solids
1 cup Fermento

INGREDIENTS FOR

10 LBS.

6 lbs. lean beef
4 lbs. pork
2 tsp. Instacure No. 1
2 Tb. ground white pepper
1 Tb. paprika
1 Tb. ground nutmeg
1 Tb. allspice
1 Tb. onion powder
5 Tb. salt
2-1/4 Tb. powdered dextrose
1-1/2 Tb. corn syrup solids
7 Tb. Fermento

After the meat is ground, add the remaining ingredients and mix thoroughly. Then place the meat in containers or tubs and pack tightly to eliminate air pockets. Do not pack more than 6" high. Then place the mixture in a cooler at 45-50° F for 48 hours. Re grind it through a 3/8" grinder plate and stuff it into protein-lined 3 1/2" x 24" casings or beef middles and keep at 45-50° F for 12 hours. Place bologna into 120° F pre-heated smoker until it starts to take on a brown color, with damper 1/2 open. Increase the smokehouse temperature to 170° F and keep the sausage there until an internal temperature of 158° F is reached. Remove the sausage and air-cool it over night at 60-70° F. Smoke the sausage again the next day for about 4 - 8 hours, or until it has a dark brown color.

After smoking, store the sausage at 65° F for 10-12 days with a relative humidity of 70- 80%. Place the sausage in a cooler at 40-45° F to achieve 18-20% weight loss.

DRY CURING A COOKED SAUSAGE

Dry curing cooked sausage is a process widely practiced by small sausage makers throughout the country. The process involves taking smoked sausage one step further and prolong its keeping qualities by drying it out, much the same way as we would a pepperoni. These sausages would be kept about 45-50° F at 70-80% humidity. What we have here is a sausage that is ready to eat at all times. But we are removing moisture equal to about 30- 35% of its original weight. This can take up to two months at the above-mentioned temperatures without spoilage. During this time the sausage may be eaten at any time, as it already has been cooked to destroy trichinae and cured to prevent botulism.

If the sausage does get some mold on it, it is simply washed off with a vinegar solution, or the mold may simply be left on and the casing with the mold peeled off before the sausage is eaten.

The 40-50° F temperatures and high humidity are excellent conditions for mold to form.

Be sure that during the dry-curing process, sausages are spread from 3-4" apart to allow moisture to escape.

Remember, your attic is not the place to dry-cure a sausage. The humidity and coolness of a cellar is much better. The following recipe may be made using this process.

SEMI-DRY CURING COOKED PEPPERONI STICKS

INGREDIENTS FOR

25 LBS.

5 tsp. Instacure No. 1
1 cup salt
5 Tb. powdered dextrose
2-1/2 Tb. ground hot pepper
2-1/2 tsp. ground allspice
4 Tb. ground anise seed
2-1/2 cups soy protein concentrate
5 cups water
1-3/4 cups Fermento
1/2 cup corn syrup solids

INGREDIENTS FOR

10 LBS.

2 tsp. Instacure No. 1
6 Tb. salt
2 Tb. powdered dextrose
1 Tb. ground hot pepper
1 tsp. ground allspice
5 tsp. ground anise seed
1 cup soy protein concentrate
2 cups water
3/4 cup Fermento
3 Tb. corn syrup solids

Pepperoni can be made of 100 percent lean beef, such as chuck, or 100 percent lean pork butts. Or, you may use any combination of these two meats. The meat is ground through a 3/16" grinder plate and placed into a mixing tub with all ingredients. Mix very well until all ingredients are properly distributed.

STUFFING

The size of casings used to make pepperoni can vary from 16-18mm lamb casings, to 38-42mm hog casings. The size and type of casings used generally is determined by what is traditional in your particular area. The pepperoni will dry out by 30% when ready, which reduces the size of the sausage.

SMOKING

Place sausage into smokehouse at 125° F with dampers wide open and no smoke until casing is dry. Close damper to 1/4, raise temperature to 165° F and hold until internal temperature is 145° F. Remove from smoker and chill with cold water until internal temperature is reduced to 90-100° F.

Traditionally, a dry-cured pepperoni is not smoked. It simply is not part of the process. If you like the flavor of smoke, however, that is your option, and your pepperoni will have a preserved quality.

CHAPTER XIII

Dry-Cured Sausage and Meat

DRY CURING HAM

Probably the oldest method of curing ham today is the dry-cure method. Using this method, you rub on a mixture of sugar, salt and cure. The ham is rubbed every 2-3 days and allowed to cure at least 40 days or more, since it takes that long for the cure to penetrate to the center of the ham.

Using this method, you should cure the ham at temperatures not lower than 36° F and not higher than 38° F. If the temperature drops below 36° F, it slows the curing process. If you allow the temperatures to go above 40° F, the ham may start to sour from the inside. You may use the following combination to mix your own cure:

3-1/2 lbs. salt

2-1/4 cups powdered dextrose

1-1/2 cups Instacure No. 2

When curing meats, the lean parts of the ham or shoulder will cure much faster, as these parts allow the cure to penetrate with less restriction. Skin and fat definitely are a barrier and prevent the meat from curing properly.

Since this type of cured meat is usually eaten without further cooking, sufficient precautions must be taken to destroy the trichinae. The following are federal meat regulations prescribing the treatment of these meats:

METHOD NO. 1:

The ham shall be cured by a dry-salt curing process for not less than 40 days at a temperature not lower than 36° F. The ham shall be laid down in salt, not less than 4 lbs. to each hundredweight of ham, the salt being applied in a thorough manner to the lean meat of each ham. When placed in the cure, the ham may be pumped with pickle if desired. At least once during the curing process, the ham shall be overhauled and additional salt applied, if necessary, so that the lean meat of each ham is thoroughly covered.

After removal from the cure, the ham may be soaked in water at a temperature of not higher than 70° F for not more than 15 hours, during which time the water may be changed once; they shall not be subjected to any other treatment

designed to remove salt from the meat, except that superficial washing may be allowed. The ham shall finally be dried or smoked not less than 10 days at a temperature not lower than 95° F.

METHOD NO. 2:

The ham shall be cured by a dry-salt curing process at a temperature not lower than 36° F for a period of not less than three days for each pound of weight (green) of the individual hams. The time of cure of each lot of ham placed in cure should be calculated on a basis of the weight of the heaviest ham of the lot.

Hams cured by this method before they are placed in the cure shall be pumped with a pickle solution of not less than 100 degrees strength (salometer). About 4 ozs. of the solution is injected into the shank and a like quantity alongside of the body bone (femor). The ham shall be laid down in the salt, not less than 4 lbs. to each hundredweight of ham, the salt being applied in a thorough manner to the lean meat of each ham.

At least once during the curing process, the ham shall be overhauled and additional salt applied, if necessary, so that the lean meat of each ham is thoroughly covered. After removal from the cure, the hams may be soaked in water at a temperature of not higher than 70° F, for not more than 4 hours, but shall not be subjected to any other treatment designed to remove salt from the meat, except that superficial washing may be allowed.

The ham shall then be dried or smoked, not less than 48 hours at a temperature not lower than 80° F, and finally shall be held in a drying room, not less than 20 days at a temperature not lower than 45° F.

LANDJAGER SAUSAGE

Landjager means land hunter in German. A Landjager in Germany was similar to our National Guard or Army Reserve. It seems this sausage was used by the field troops, as U.S. armed forces use K or C rations. Landjager also is referred to as a pressed sausage and is very popular sausage in the midwestern part of the U. S. A.

INGREDIENTS FOR 25 LBS.

1-1/4 cup salt
5 tsp. Instacure No. 2
1/2 cup corn syrup solids
1 Tb. ground white pepper
1 Tb. ground caraway seeds
1 Tb. ground coriander
3-3/4 cups Fermento
1/2 cup powdered dextrose
19 lbs. lean beef
6 lbs. fat pork
2-1/2 Tb. cardamom
1 Tb. nutmeg

INGREDIENTS FOR 10 LBS.

7 Tb. salt
2 tsp. Instacure No. 2
3 Tb. corn syrup solids
1 tsp. ground white pepper
1 tsp. ground caraway seeds
1 tsp. ground coriander
1-1/2 cup Fermento
3 Tb. powdered dextrose
7-1/2 lbs. lean beef
2-1/2 lbs. fat pork
1 Tb. cardamom
1 tsp. nutmeg

PROCESSING PROCEDURE

All meat should be chilled at 32-34° F before grinding. Then grind through a 1/4" grinder plate, add all ingredients and mix well. The mixing of the meat should be done as quickly as possible to avoid smearing the fat meat. Ingredients can be properly distributed in about 2 minutes of mixing. The meat is stuffed loosely into a 32-35mm hog casing and made into links 7-8" long. Sausage is held at 70- 75° F for 3-4 days with humidity of 70-80%. The Landjager sausage is placed into a wooden mold and pressed into a unique flat but oblong shape. The sausages are placed very tightly against each other and a weighted board placed on top of them. The sausages then are removed from molding boards and placed on smokehouse sticks. Hold in room at 52-55° F for 2 days, drying with humidity around 70%.

Sausage is cold-smoked until desired color is obtained. Be sure the smoke never exceeds 80° F.

Only certified pork trimmings should be used in processing Landjager sausage. This processing procedure does not conform to government regulations concerning destruction of live trichinae. Since certified pork is nearly impossible to purchase, follow instructions on page 40.

DRY-CURED SOPRESSATA

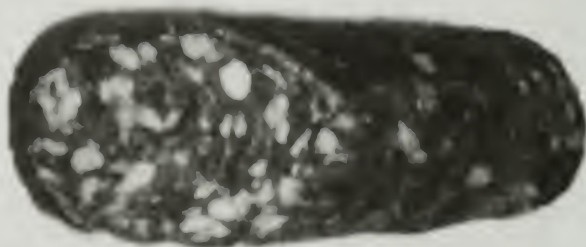
Sopressata can be made of either fresh hams or pork butts. It sometimes is made using beef, but pork is the traditional meat used.

INGREDIENTS

8 lbs. lean pork
2 lbs. back fat
7 Tb. salt
3 Tb. powdered dextrose
2 Tb. whole black pepper
2 Tb. ground black pepper
1/2 cup corn syrup solids
2 level tsp. Instacure No. 2
1 Tb. hot cayenne pepper (optional)

Chill meat and pork fat to 32 to 34° F. Grind all meat and pork fat through 1/2" or 3/4" grinder plate. Add all ingredients and mix well. Remove meat to tub container, packing meat tightly not over 6-7" high and refrigerate for 48 hours. Remove from cooler, grind meat through 1/4" plate and stuff into hog middle 8-10" long. Sausage then held for 48 hours at about 55° F and then is placed into smokehouse. Sausage is smoked for 48 hours with cold smoke until color is obtained.

Remove from smokehouse and keep at 50-60° F with humidity around 70-80%. Hold about 8-10 weeks. Product will be ready when it loses about 30% of its green weight.



The above sopressata has been cut to show that it does contain a lot of fat. This is proper and preferred by the lovers of this sausage.

DRIED CHORIZOS

INGREDIENTS FOR

25 LBS.

1 cup salt
2-1/2 cups water
2-1/2 cups white vinegar
2/3 cup Spanish paprika
1/2 cup hot cayenne pepper
1/2 cup granulated garlic
1/2 cup oregano
5 tsp. black coarse pepper
5 tsp. Instacure No. 2
1 cup corn syrup solids
3-3/4 cups Fermento

INGREDIENTS FOR

10 LBS.

7 Tb. salt
1 cup white vinegar
4 Tb. Spanish paprika
3 Tb. hot cayenne pepper
3 Tb. granulated garlic
3 Tb. oregano
2 tsp. black coarse pepper
2 tsp. Instacure No. 2
3 Tb. corn syrup solids
1-1/2 cup Fermento
1 cup water

A dried chorizo can be made using any combination of lean meats or 100% pork butts. grind all chilled meats 32-34° F through a 1/2" grinder plate. Add all ingredients to meat and mix well. Remove meat to a container and pack very well to avoid air pockets. Cure overnight at 34-36° F.

Before stuffing, regrind meat through a 1/4" or 3/8" plate. This will allow easier stuffing into a 35- 38mm hog casing. Sausage is placed on smokesticks, spaced properly, and allowed to ripen for 3 days at 70-75° F with humidity of 70-80%. Then space sausages about 3-4" apart and dry for 15 days at 50-55° F humidity at 60-70%.

Sausage may then be placed into containers and filled with lard. This is an especially popular method of storage with the Cuban people.

CAPICOLA - DRY CURED

INGREDIENTS FOR

100 LBS.

4 lbs. salt

2 cups powdered dextrose

1/2 cup Instacure No. 2

INGREDIENTS FOR

25 LBS.

1 lb. salt

1/2 cup powdered dextrose

2 Tb. Instacure No. 2

MEAT

Lean boneless pork butts that are 3-4 lbs. apiece and well trimmed should be used. The internal temperature of the butts should be chilled to 34-36° F before use.

PROCESSING

Rub the pork butts very well with this dry cure mixture. Lay down a layer of this cure mixture in a container; layer the pork butts sprinkling leftover cure between each layer. Place into the cooler at 36-46° F for not less than 25 days. After 10 or 12 days, the pork butts should be overhauled; the top ones placed on the bottom, and the bottom ones placed on top.

Have additional spice-cure mixture ready to put between each layer. After 25 days, the pork butts are removed from the cooler and washed lightly. Allow to drain; then rub with Spanish paprika and red ground pepper. The pepper to be rubbed in depends on individual preference. The pork butts are then stuffed into beef bungs.

There will be many air pockets; be sure you pin prick these air pockets to allow the entrapped air to escape. Hang on smokesticks, properly spaced.

SMOKING

Pork butts are placed in a preheated smokehouse at 90° F with the dampers wide open to dry the casings. Hold at this temperature for 10 hours. During this period, you may close dampers to 1/4 open after the casings are dry, applying a light smoke; continue to smoke for another 15-20 hours at 90° F.

Butts then are removed from the smoker and dipped in hot boiling water momentarily to shrink the casing onto the capicola. Then place in dry room at 70-75° F with a relative humidity of 65- 75%. Capicola must be held in dry room not less than 20 days before using.

PROSCIUITTI (DRY CURED)

INGREDIENTS FOR

100 LBS.

4 cups ground white pepper
1 cup ground black pepper
7 cups allspice
1-1/4 cups ground nutmeg
1/4 cup ground mustard
3/4 cup coriander
4 cups powdered dextrose
1-1/4 cup Instacure No. 2
4 lbs. salt

INGREDIENTS FOR

25 LBS.

1 cup ground white pepper
4 Tb. ground black pepper
1-3/4 cup allspice
5 Tb. ground nutmeg
1 Tb. ground mustard
3 Tb. coriander
1 cup powdered dextrose
5 Tb. Instacure No. 2
1 lb. salt

Hams selected for "prosciutti" should be free of bruises and in the 10-15 lb. range. The skin is left on the entire ham, but be sure that the fat is not over 1-1/2" thick. Hams are chilled to 34-36° F.

100 LB. Recipe

Premix all of the above ingredients, except the purified salt and instacure #2. Add 7 oz. of ingredients to each 4 lbs. of purified salt and 1 1/4 lbs. of instacure #2. Mix thoroughly. Rub hams well on all sides with the spice cure mixture, making sure all crevices are rubbed. Wrap in butcher paper.

25 Lb. Recipe

Premix all of the above ingredients for the 25 Lb. recipe except the purified salt and instacure #2. Add 3 oz. of ingredients to 1 lb. of purified salt and 5 level Tb. of instacure #2. Mix thoroughly. Rub hams well on all sides with the spice cure mixture. Rubbing all crevices. Wrap in butcher paper.

8 Lb. Recipe- Half of Fresh Ham

When doing 1/2 ham, select the shank end. The bone in the shank end is much easier to remove and there would be less damage to the meat and a cleaner looking finished product.

Premix 1/2 of the ingredients listed in the 25 Lb. recipe, except the purified salt and instacure #2. Add 1-1/2 oz. of the mixed ingredients to 1/3 lb. of purified salt and 2 Tb. of instacure No. 2. Mix thoroughly. Rub hams well on all sides with spice cure mixture making sure all crevices are rubbed. Wrap in butcher paper.

Place ham between two clean wooden boards. (Large enough to handle one ham) Place ham in cooler at 36-38° F. Cover ham with a canvas or other material that is similar, to avoid as much air as possible. Place a weight about twice as heavy as the ham, to flatten. "Prosciutti" is known for its flat shape. Put a cloth underneath to absorb juice that will be pressed out during the curing process.

When doing more than one ham, stack with the spice mixture in between with a maximum of four hams. **STACK HAMS SKIN SIDE DOWN.**

Cure hams about 10 days in cooler at 36-38° F; be sure the temperature never drops below 36° F. Hams should also be kept covered during the curing time to keep out as much air as possible. After 10 days, turn hams so that top hams are now on the bottom, re-rub hams adding the left over mixture, and cure for an additional 40 to 45 days, making sure that the hams are covered with the canvas material. After 45 days remove hams from cooler and place in cool water for at least 15 hours to soak.

Be sure water isn't over 65° F, you must change the water after 7-8 hours. After removing from the water, scrub the skin of the ham with a soft brush to remove the salt. Hams are then tied and hung on a smokestick spaced properly.

SMOKING

Hams are placed in a smokehouse preheated to 130° F with dampers 1/4 open. Hold for 48 hours at this temperature. After 48 hours, raise the temperature to 140° F and hold for 2 hours. Raise temperature gradually 10° each half hour, until temperature reaches 170° F. Hold this temperature for 2 hours. After 2 hours let smokehouse temperature drop to 120° F and hold at this temperature for 8 to 10 hours. Ham is rubbed with equal parts of white and black pepper. After rubbing, hang hams on smokesticks, properly spaced, and remove to the dry room. Hold temperature at 70-75° F with relative humidity of 65-75 % for 30 days.

NOTE:

The bone is removed from the Italian-style ham before it is cured. This enables the ham to be pressed flat to a thickness of about 2 inches.



**Proscuiti
Ham**



DRY-CURED PEPPERONI - ITALIAN STYLE

INGREDIENTS FOR

25 LBS.

1 cup salt
1/2 cup powdered dextrose
5 tsp. Instacure No. 2
2.5 Tb. ground hot red pepper
2.5 tsp. allspice
3 Tb. ground anise seed
2/3 cup corn syrup solids
12-1/2 lbs. lean pork butts
2-1/2 lbs. regular pork
10 lbs. boneless beef

INGREDIENTS FOR

10 LBS.

7 Tb. salt
3 Tb. powdered dextrose
2 tsp. Instacure No. 2
1 Tb. ground hot red pepper
1 tsp. allspice
5 tsp. ground anise seed
4 Tb. corn syrup solids
5 lbs. lean pork butts
1 lbs. regular pork
4 lbs. boneless beef

GRINDING & MIXING

grind all the meat through a 3/16" grinder plate. Use mixer and add all the ingredients mixing evenly; regrind through 1/8" plate. The meat now is ready for stuffing.

STUFFING

It is essential that the meat be well-chilled to avoid smearing. The meat should be stuffed into 24- 26mm lamb casings.

DRYING

Hold pepperoni at 70° F for about 2 days maintaining a relative humidity of about 75%. The product should be kept in a 38-40° F cooler for at least 20 days from the time the cure has been added to the pepperoni. Be sure that casings used are not more than 1-3/8" in diameter, as this formula applies only to casings below this range.

DRY-CURED HARD SALAMI

INGREDIENTS FOR

25 LBS.

1 cup salt
2/3 cup corn syrup solids
5 tsp. Instacure No. 2
2-1/2 Tb. ground white pepper
2-1/2 tsp. ginger
2-1/2 tsp. garlic powder (optional)
1/2 cup powdered dextrose
6-1/2 lbs. lean boneless beef
16-1/4 lbs. lean pork
2-1/2 lbs. backfat

INGREDIENTS FOR

10 LBS.

7 Tb. salt
4 Tb. corn syrup solids
2 tsp. Instacure No. 2
1 Tb. ground white pepper
1 tsp. ginger
1 tsp. garlic powder (optional)
3 Tb. powdered dextrose
2-1/2 lbs. lean boneless beef
6-1/2 lbs. lean pork
1 lb. backfat

GRINDING & MIXING

Be sure that all the meat is chilled around 30-32° F grind all the beef through a 1/8" grinder plate and all the pork through a 3/8" plate. Backfat should be cut or diced into 3/4"-1" squares and frozen. Place all the meat into a mixer, adding all the ingredients including frozen back fat mix well. grind all the meat through a 1/8" plate. Pack all the meat into tubs not over 6" high. Be sure that the meat is packed very tightly to eliminate the air pockets. Hold in a cooler at 38-40° F for 72 hours.

STUFFING

Remove the meat, place in stuffer and pack the meat very tightly to eliminate air pockets. The meat should be stuffed into a defatted beef middle about 3" x 20". You can use a protein-lined fibrous casing. After stuffing the casings full, tie the ends and wrap the salami with a loop about every 2 or 3", to give it that stuffed look.

CURING

Salami should be allowed to cure for 3-4 days at 70-75° F with a relative humidity of 70- 80%.

SMOKING

Dry salami need not be smoked; however, if you wish to smoke, be sure that the temperature of the smokehouse never reaches over 90° F. It is best to smoke the salami at temperatures of 75-85° F, with a relative humidity of 70%. Keep in smokehouse until the desired color is obtained.

DRYING

The smoked salami should be kept at 50-60° F with a relative humidity of 70-72%. For salami that is not smoked, keep at 40-50° F with relative humidity of 70-72%. This salami is fully dried when it loses 25% of its green weight. This takes from 85-90 days.

DRY-CURED FARMERS SAUSAGE

INGREDIENTS FOR

25 LBS.

1 cup salt
1-1/4 cups corn syrup solids
5 tsp. Instacure No. 2
5 Tb. ground black pepper
1/2 cup powdered dextrose
20 lbs. lean boneless beef
3-3/4 lbs. lean pork trimmings
1 1/4 lbs. backfat

INGREDIENTS FOR

10 LBS.

7 Tb. salt
8 Tb. corn syrup solids
2 tsp. Instacure No. 2
2 Tb. ground black pepper
3 Tb. powdered dextrose
8 lbs. lean boneless beef
1-1/2 lbs. lean pork trimmings
1/2 lbs. backfat

GRINDING & MIXING

Be sure all the meat has been pre-chilled at 32-34° F. grind all the beef through a 1/8" grinder plate. All the pork including back fat should be ground through a 1/2" plate. Place into mixer and add all the ingredients and mix well so that all the spices are evenly distributed with the meat. Place all the meat into tubs or pans, not over 6" high; pack the meat tightly to eliminate all air pockets. Leave in 34-38° F cooler for 3 days.

STUFFING

After three days, meat should be packed into the stuffer tightly and stuffed into beef middles 3-1/2" x 20" or 3-1/2" x 24" protein-lined casings. Sausage should then be held at 75° F with a relative humidity of 75-80% for about 12 hours.

SMOKING

The smokehouse temperature should be kept at 75-80° F, with a relative humidity of 75- 80%. Smoke for 3 days with a very heavy smoke. This sausage is then dried at 52-56° F for at least 30 days, maintaining a relative humidity of 65%.

DRY-CURED GENOA SALAMI

INGREDIENTS FOR

25 LBS.

1 cup salt
1/2 cup corn syrup solids
2-1/2 Tb. whole black pepper
2-1/2 Tb. ground white pepper
2-1/2 Tb. garlic powder
1 cup good Italian dry wine
5 tsp. Instacure No. 2
1/2 cup powdered dextrose
22 lbs. very lean pork
or boneless beef
3 lbs. backfat

INGREDIENTS FOR

10 LBS.

7 Tb. salt
3 Tb. corn syrup solids
1 Tb. whole black pepper
1 Tb. ground white pepper
1 Tb. garlic powder
1/3 cup good Italian dry wine
2 tsp. Instacure No. 2
3 Tb. powdered dextrose
8-1/2 lbs. very lean pork
or boneless beef
1-1/2 lbs. backfat

PROCESSING

When selecting the meat, always be sure that all the blood clots are removed and thrown away. In addition, separate all the connective tissues, sinews, or cords. Cut all the lean pork and backfat into 1/2 lb. pieces and freeze. All the meats are then removed from the freezer and ground through a 1/4" or 3/16" grinder plate.

Start the mixer and add all the ingredients; mix until the spices are evenly distributed. The meat then is placed into tubs or pans not over 6" high and packed tightly to omit all the air pockets. Place in 38° F cooler for 48 hours.

STUFFING

For stuffing salami, use a hog bung, with a diameter 3-1/2" x 20" long. After stuffing you may wrap a loop with the twine about every 2". You can also use protein-lined casings as well, or some of the cloth casings that are available today.

CURING

The salami should be cured at 70-75° F with a relative humidity of 70-80% for 48 hours. Genoa salami is not smoked and after 48 hours should be placed into a cooler at 45-55° F for

70-80 days with a relative humidity of 75%.

NOTE:

GENOA SALAMI CAN BE MADE ENTIRELY OF PORK OR ENTIRELY OF BEEF. WHEN USING HOG BUNGS, YOU MAY, AFTER STUFFING THE SALAMIS, PLACE THEM IN A BRINE AT 50 DEGREES SALINOMETER READING, AT A TEMPERATURE OF 34-38° F FOR 1 OR 2 DAYS. After removing the salami from the brine, place into a hot simmering water for 3 seconds. This process will help to remove all the excess fat and open the pores of the hog bung, which in turn promotes better drying of the salami.

DRY-CURED COUNTRY HAM

(This ham does not need to be refrigerated after curing and smoking.)

INGREDIENTS FOR

100 LBS.

7 lbs. salt
4 cups powdered dextrose
2-1/2 cups Instacure No. 2
5 gallons ice water
38-40° F

INGREDIENTS FOR

25 LBS.

1 lb. 8 ozs. salt
1 cup powdered dextrose
2/3 cup Instacure No. 2
5 quarts ice water
38-40° F

PROCESSING

Artery-pump the ham 8% by weight. Be sure you weigh the pickle. Dry-rub the ham, using the same curing mix-using 3 lbs. for each 50 lbs. of ham. The ham then is placed on a rack in the cooler at 38-40° F for 15 days. Re-rub the ham with cure mix on the 7th day. Ham is then removed and scrubbed under running water to remove the surface salt. **DO NOT SOAK.** Ham is then dried off and removed to the smoke-house.

SMOKING

Smoke hams as follows: preheat smokehouse to 120° F Hold for 8 hours at 120° F with draft open, no smoke; 16 hours at 125° F , drafts 1/2 open, light smoke; 48 hours at 120-125° F until the internal temperature is not more than 122° F.

SPECIAL NOTE:

Do not smoke the hams at higher temperatures and do not allow the internal temperature to reach beyond 122° F Otherwise, the keeping quality is greatly reduced. A country ham has to be of low moisture and a high salt content to preserve it.

SMITHFIELD HAM

Over the years many people throughout the country have tried to duplicate the flavor of the Smithfield ham. The following information is not a formula; rather it shows how difficult it can be to process such a ham. This is a unique product because the hams are made only from peanut-fed hogs. Regular pork will not cure as completely nor as uniformly as peanut-fed hogs due to the oiliness and softness of the pork.

The Smithfield ham also has a unique look because the ham is cut at the hip and the full shank is left on. Only the toes are cut off and the full skin is left on the ham. The hams are rubbed all over with instacure #2, as much as will adhere to the leg. The hams then are left to cure for 24 hours.

After 24 hours, the hams are placed on a bed of salt, after being rubbed with plain salt. The hams then are stacked on edge, overhauled every 7 days, and stacked on the opposite edge after each overhaul. The hams are cured this way for 30-45 days, depending on size. After the ham is cured, it is washed, hung in a very large smokehouse, and allowed to dry for 3-4 days.

It is smoked by burning 3"-4" hickory logs and sassafrass for at least 7 days. The logs are burned in 55-gallon drums that are distributed around the smokehouse. This is a cold-smoke process. After smoking, it is left in the smokehouse for about 6 months.

The Smithfield ham or a reasonable facsimile is rather difficult to produce unless you have a steady supply of peanuts and a huge smokehouse 3-4 stories high.



Notice only the toes have been cut off and the full shank has been left on. The full skin is also left on.

DRY-CURED OLD-STYLE SUMMER SAUSAGE

INGREDIENTS FOR 25 LBS.

15 lbs. pork butts
8 lbs. lean beef
2 lbs. back fat
1-1/4 cups salt
3-3/4 cups Fermento
5 tsp. Instacure No. 2
1/2 cup powdered dextrose
1/2 cup corn syrup solids
2-1/2 Tb. ground black pepper
2-1/2 Tb. ground mustard seed
2-1/2 tsp. ground ginger
2-1/2 tsp. granulated garlic

INGREDIENTS FOR 10 LBS

6 lbs. pork butts
3 lbs. lean beef
1 lb. back fat
7-1/2 Tb. salt
1-1/2 cup Fermento
2 tsp. Instacure No. 2
3 Tb. powdered dextrose
3 Tb. corn syrup solids
1 Tb. ground black pepper
1 Tb. ground mustard seed
1 tsp. ground ginger
1 tsp. granulated garlic

Before making this summer sausage, you must first dry-salt the back fat for 2 weeks in order to cure it properly. The back fat should be held at a temperature of 38-40° F, using the following mixture for:

2 LBS. OF BACK FAT

1/2 cup Instacure No. 2
1-3/4 cups salt

Rub the entire piece of back fat with this mixture, coating the surface, wrap in freezer paper and place in a cooler for 2 weeks. Use plenty of this mixture and rub very well.

After the back fat is cured, the excess salt should be brushed away, but not washed. Then grind the fat through a 3/16" grinder plate. The rest of the meat should be ground through a 1/4" grinder plate. Add the remaining ingredients and mix thoroughly until evenly distributed. Pack the mixture tightly into tubs about 6" high, making sure there are no air pockets. Place in a cooler at 38-40° F for at least 4 days, but not more than 6. Then stuff the mixture into protein-lined casings, 3-1/2" x 24", or 3-1/2" beef middles.

Hang the sausage in the drying room at 45-50° F for 60-70 days with a relative humidity of 70-80%.

DRY-CURED PLOCKWURST (Block Sausage)

INGREDIENTS FOR

25 LBS.

20 lbs. lean beef
5 lbs. frozen fresh bacon
1 cup salt
5 tsp. Instacure No. 2
1 cup powdered dextrose
2/3 cups corn syrup solids
5 Tb. ground white pepper

INGREDIENTS FOR

10 LBS.

7 1/2 lbs. lean beef
2 1/2 lbs. frozen fresh bacon
7 Tb. salt
2 tsp. Instacure No. 2
6 Tb. powdered dextrose
4 Tb. corn syrup solids
2 Tb. ground white pepper

Chill the meat to 32-34° F. The beef should be ground through a 1/4" grinder plate; the frozen bacon at about 26-28° F should be sliced about 1/4" thick and then ground through a 3/8" grinder plate. Add the remaining ingredients, mixing thoroughly until evenly distributed. Stuff the mixture in a beef middle or 3 1/2" x 24" protein-lined casing.

Cure the sausage at 65-70° F for 48 hours with a relative humidity of 70-80%. Place it in a cooler at 45-50° F with a relative humidity of 70-75%. Keep sausage there for about 70-80 days before using.

DRY-CURED WESTFALIA HAM SAUSAGE

INGREDIENTS FOR

25 LBS.

7-1/2 lbs. lean beef
10 lbs. lean pork
7-1/2 lbs. frozen fresh bacon
1 cup salt
5 tsp. Instacure No. 2
2/3 cup corn syrup solids
2-1/2 Tb. ground black pepper
1/3 cup good rum
1 cup powdered dextrose

INGREDIENTS FOR

10 LBS.

2-1/2 lbs. lean beef
5 lbs. lean pork
2-1/2 lbs. frozen fresh bacon
7 Tb. salt
2 tsp. Instacure No. 2
4 Tb. corn syrup solids
1 Tb. ground black pepper
3 Tb. good rum
1/3 cup powdered dextrose

Remove bacon rind and freeze the bacon at about 26-28° F. Remove the bacon from the freezer and cube it into 1" squares. Grind the lean pork and beef through a 3/8" grinder plate. Thoroughly mix the frozen bacon and meat with the remaining ingredients. Then stuff into protein-lined fibrous casings 3-1/2" x 24" or a hog bung.

Let the ham sausage cure at 65-70° F for about 48 hours with a relative humidity of 70- 80%. Put sausage in a cooler at 45-50° F with a relative humidity of 70-75%. Store sausage for 70-80 days before using.

DRY-CURED HOLSTEINER SAUSAGE

INGREDIENTS FOR 25 LBS.

18-3/4 lbs. lean beef
6-1/4 lbs. lean pork
1 cup salt
5 tsp. Instacure No. 2
3/4 cup corn syrup solids
1 cup powdered dextrose
1/2 cup ground black pepper
1 cup Fermento

INGREDIENTS FOR 10 LBS.

7-1/2 lbs. lean beef
2-1/2 lbs. lean pork
7 Tb. salt
2 tsp. Instacure No. 2
5 Tb. corn syrup solids
1/3 cup powdered dextrose
3 Tb. ground black pepper
6 Tb. Fermento

Be sure meat is chilled to 32-34° F before starting. grind the pork through a 1/2" grinder plate and the beef through a 3/16" grinder plate. Add the remaining ingredients and mix thoroughly until evenly distributed. Pack the mixture into a container not more than 6" high, packing tightly to omit any air pockets. Place mixture in a cooler at 36-38° F and allow to cure for 72 hours.

After three days, stuff the mixture into protein-lined fibrous casings 3-1/2" x 24" or a 3-1/2" beef middle. Then keep sausage for 12 hours at 75° F with a relative humidity of 70-80%.

SMOKING

Unlike most dry-cured sausage, the Holsteiner sausage is smoked. Place in smokehouse using no heat but a dense smoke for 3-4 days. Place sausage in a cooler at 50-55° F and allow to cure for at least 30 days with a relative humidity of 65-60%.

DRY-CURED SMOKED POLISH SAUSAGE **(Kielbasa Polska Surowa Wedzowa)**

INGREDIENTS FOR 25 LBS.

25 lbs. pork butts
5 tsp. Instacure No. 2
1 cups salt
2-1/2 Tb. coarse black pepper
2/3 cup powdered dextrose
2/3 cup corn syrup solids
2-1/2 tsp. ground marjoram

INGREDIENTS FOR 10 LBS.

10 lbs. pork butts
2 tsp. Instacure No. 2
7 Tb. salt
1 Tb. coarse black pepper
1/4 cup powdered dextrose
4 Tb. corn syrup solids
1 tsp. ground marjoram

grind meat through 3/4" grinder plate. Add remaining ingredients and mix well until evenly distributed. Stuff mixture into 35-38mm hog casings and form 5-6" links. Place sausage in cooler for 48 hours at 38-40° F. After this, place in a cold smokehouse (no heat), applying very dense smoke for at least 12 hours. This will produce a dark brown sausage. Store at 50-60° F with a relative humidity of 70-80% until you achieve a weight loss of 20-30% (around 15 days).

DRY-CURED ITALIAN SAUSAGE

INGREDIENTS FOR

25 LBS.

25 lbs. pork butts
1 cup salt
5 tsp. Instacure No. 2
2-1/2 Tb. cracked fennel seed
2/3 cup powdered dextrose
1/2 cup ground cayenne pepper
3/4 cup corn syrup solids
2-1/2 Tb. ground coriander

INGREDIENTS FOR

10 LBS

10 lbs. pork butts
7 Tb. salt
2 tsp. Instacure No. 2
1 Tb. cracked fennel seed
4 Tb. powdered dextrose
3 Tb. ground cayenne pepper
5 Tb. corn syrup solids
1 Tb. ground coriander

Grind pork through a 3/4" grinder plate. Add remaining ingredients and mix well until evenly distributed. Pack meat mixture in pans not more than 6" high, packing tightly to omit air pockets.

Place meat in 38-40° F cooler for 48 hours. Then regrind meat through a 3/16" grinder plate and stuff in 35-38mm hog casings. Place sausage in a drying room at about 60° F with a relative humidity of 65-70° F for 48 hours. Then put sausage in a 38-40° F cooler and allow to cure for 20 days before using. Your cooler should also have a relative humidity of 60-70° F during these 20 days.

DRY-CURED POLISH SALAMI

(Salami Polskie Sucha)

INGREDIENTS FOR 25 LBS.

10 lbs. lean pork
7 1/2 lbs. lean beef
7 1/2 lbs. fresh bacon
1 cup salt
5 tsp. Instacure No. 2
2-1/2 Tb. ground black pepper
2-1/2 tsp. ground cardamon
2/3 cup powdered dextrose
2/3 cup corn syrup solids

INGREDIENTS FOR 10 LBS.

5 lbs. lean pork
2-1/2 lbs. lean beef
2-1/2 lbs. fresh bacon
7-1/2 Tb. salt
2 tsp. Instacure No. 2
1 Tb. ground black pepper
1 tsp. ground cardamon
4 Tb. powdered dextrose
4 Tb. corn syrup solids

Mix the salt and Instacure No. 2 and rub into the bacon thoroughly. Then wrap the bacon in freezer wrap or butcher paper, if you are making a small amount of sausage. A plastic bag is also acceptable. Place in a cooler at 40° F and store for 12 days. Be generous with the salt-cure mix when rubbing the bacon. On the 6th day, grind the lean beef and pork through a 3/4" or 1" grinder plate. Add the remaining ingredients and mix thoroughly until evenly distributed. The mixture is then tightly packed into a container or tub not more than 6" high, making sure there are no air pockets. Place in cooler and remove all meat on the 12th day. Then grind the lean meat mixture through a 3/16" or 1/4" grinder plate. Clean the excess salt from the bacon and grind through a 3/8" grinder plate. Combine the two mixtures and mix thoroughly. This mixture is again tightly packed into a container not more than 6" high, being sure to eliminate air pockets. Place mixture in a cooler at 38-40° F for another 24 hours. Then remove it and stuff into 3-1/2" x 24" casings. You may also use other casings - beef, pork or protein-lined fibrous casings.

Place the sausage in a cooler at 40° F with a 80-90% humidity rate. After 4 days, hang the sausage at 55-60° F for 6-8 weeks with a humidity of 70-80%. You will achieve a 30% weight loss in this period of time.

Place sausage in a smokehouse with no heat but dense

smoke until it has a dark red appearance. This may take several days to achieve at 8-10 hours a day of smoking.

CHAPTER XIV

Fish and Seafood

PRESERVATION ACTION IN CURING FISH

Food preservation is essentially the prevention of spoilage. The most important cause of spoilage is through micro-biological action. Fresh, dried, salted or smoked fishery products may be rendered unfit for use by a wide variety of causes other than ordinary forms of spoilage.

The spoilage organisms require moisture and warmth for development, and the most favorable temperatures for this are from 70-100° F. Therefore, removal of a large part of the moisture from a given product and its storage at temperatures unfavorable for bacterial development have a direct effect. Cured fishery products should be held at temperatures below 70° F if the maximum preservation is to be obtained.

For the maximum length of preservation, moisture should be reduced to about 20%. This usually requires a long curing period and some special equipment. Under ordinary home conditions, cured products with a moisture content of 40% are about all that can be expected.

The chemical cause of spoilage most common in cured fishery products is oxidation. If the surface of the flesh is exposed to air or sunlight, it turns yellow to brown and acquires an unpleasant, rancid flavor.

To best protect home-cured fishery products against these chemical and physical spoilages, they should be placed in a tightly-closed container and kept in a dry, cool place, preferably dark. Brine-cured products should be weighed down so that they will be kept below the surface of the brine. Smoked products should be coated with a thin coating of paraffin or dusted with a fine salt, wrapped in oiled or parchment paper, and packed in a tightly-closed box or container.

PRESERVATION OF FISH

Fish may be corned, brine cured, dry salted, smoked or pickled (vinegar cured). These methods have several advantages over canning: they are simpler, do not require much equipment, are less expensive, and permit utilization of varieties not canned successfully.

However unlike canning, these methods do not preserve indefinitely; in fact, for certain fish and certain methods, preservation is limited to a comparatively brief period. The single disadvantage, though important, does not outweigh the many advantages of fish curing. Moreover, even when containers and canning equipment are readily available, fish curing is often preferable to canning.

CORNING

(Temporary Preservation While Fishing)

Sport fishermen and the casual angler sometimes bring in catches in poor condition due to warm weather and improper handling.

Such waste is avoidable if proper procedure are followed. Bleed the fish as soon as it is caught by pulling out the gills completely, leaving no remnants. Clean the fish as soon as possible, scraping out all traces of blood and intestinal material. Wash the body cavity thoroughly as cleaning delays spoilage.

Rub the belly cavity with a fine table salt containing one tablespoon of pepper per cup. Rub salt into the flesh at a ratio of about one tablespoon to a 3/4-pound fish, dusting a small amount on the skin side.

Place the fish in a basket or a box. A loose packing of green leaves around the fish has been found useful in inland regions. Cover the container with several thicknesses of burlap. The burlap must not rest on the fish since there should be an air space above them. Keep the cloth well moistened with water, since evaporation of moisture lowers the temperature in the container.

Treated in this manner, fish should remain in good condition for at least 24 hours when ice is not available. When rinsed thoroughly, the fish so treated are ready for cooking in any way desired. If rolled in salt and packed away with as much of it as will cling to them, they will keep for about 10 days. Before using, these fish should be freshened for about 10 hours in one or two changes of water.

BRINE SALTING

Brine salting of fish requires a set of 1-5 gallon containers with a tight-fitting cover; 1-2 tubs or cut-down barrels for washing or preliminary brining; and at least 2 sharp knives, one large and one small. If storing less than 50 pounds of fish, you can get by with only one sharp knife and a 2-gallon container. It is best to use stoneware or stainless steel containers, as they may be used for other purposes since they do not absorb foreign flavors.

The salt used should be pure and clean, free from dirt and moisture. It should be a fairly small grain, preferably "dairy fine." Many commercial salters prefer the coarsely-ground salt, but a finely ground salt is preferable in home salting as it forms into brine and penetrates the flesh more rapidly. Salt that is not pure and clean can cause delay of the brine penetration and give the product an acrid, salty flavor, whereas the pure salt imparts a much milder favor. It is usually better to allow the brine to form by packing the fish and salt in layers. Even a saturated brine may be weakened sufficiently to cause spoilage during salting. The danger is that too much or too little salt may be used. Too much salt may "burn" the fish, while too little may permit fermentation and spoilage during curing.

The number of species salted commercially is quite limited, but almost any variety may be salted at home. As a rule, the so-called "lean" species are salted more readily; salt brine does not penetrate as rapidly in "fat" fish. With the latter, oxidation and rancidity occur more readily, and they need extra care both in salting and storing. When cured successfully, they make a saltfish of the finest quality.

Fresh-water fish usually salted are lake trout, whitefish, lake herring, blue pike, yellow pike (pickerel), catfish and perch. Others that may be salted at home are sheepshead, carp, suckers, buffalofish, river herring (aslewife), eels-in fact, any fish of satisfactory size.

Salt-water fish commonly salted are cod, hake, pollock, bluefish, sea trout, channel bass, rock or striped bass, salmon, shad, sea bass, rock fish, mackerel, sea herring and Florida mullet. Others that are salted but not to such an extent

are crocker, hogfish, scup, butterfish, spots, whiting, grouper, halibut, sablefish and snook.

In general, the method for pickling is the same for all varieties.

Smaller fish are split down the back so as to lie flat in one piece with the belly not cut through. A cut is made just under the backbone and the fish is scored with the point of the knife at intervals about one inch apart. All the traces of blood or membrane are cleared away, and the gills removed from the split head.

Large fish are split into two fillets, removing the backbone. The collarbone just below the gills is not cut away. The fish are damaged more in handling if this is removed; if you intend to smoke the brined fish, the pieces will often drop from the smokehouse hangers since the skin and the flesh cannot support the weight unless the collarbone is present.

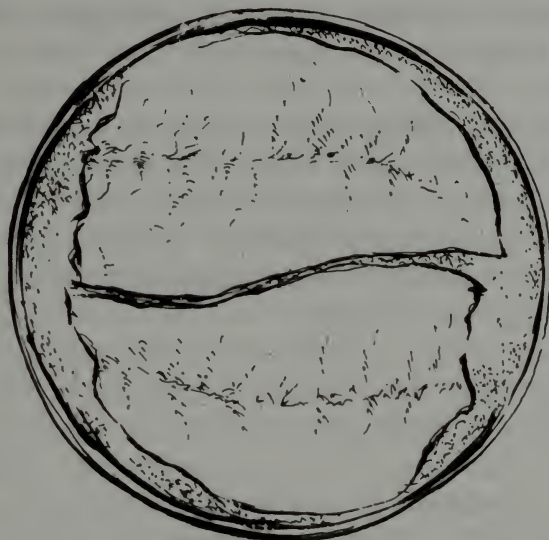
The flesh of the large pieces of fillets is scored longitudinally to a depth of about 1/2" at intervals of 1-2 inches. The cuts should not penetrate to the skin. Cut the pieces just long enough to lie flat on the bottom of the container.

Thick-skinned, spiny-finned fish with large scales, such as carp, suckers, buffalo, black bass, channel bass and catfish should be skinned and the fins removed. This is best done by making a deep cut along each side of the fin, which is then pulled away by hand. This method is much faster than the usual system of clipping, and removes the small bones in the flesh at the base of the fins.

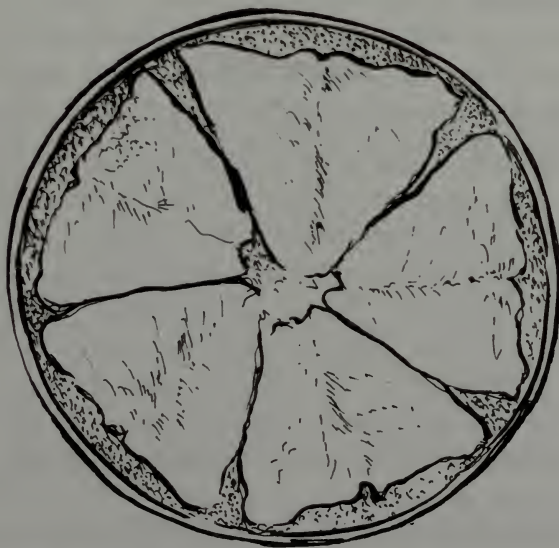
The fish, whether large or small, are thoroughly washed in fresh water, after which they are soaked for 30 minutes to 1 hour in a brine made in a proportion of 1/2 cup salt to 1 gallon of water to remove the diffused blood from the flesh and to cut away slime from the skin. The fish are drained for 5-10 minutes after brining.

Make a shallow box about 2' square and with sides 6" high. Fill this with dry salt. Scatter a thin layer of salt on the bottom of the container or keg in which the fish are to be salted. Dredge each piece of fish with salt and rub into the places where the flesh is scored. Pick up the fish with as much salt

as will cling to it and pack into the container, skin side down. Arrange the pieces so that an even layer will result. Pieces should overlap each other as little as possible.



Method of packing large fish in container for brine salting.



Method of packing small fish in container for brine salting.

The amount of salt used depends on the purity and grain of the salt. Less is required if the salt is of high purity and small grain. More salt is required in warm weather, and large, thick or fat fish require more salt. The proportion of salt used runs from 1/4-1/3 of the total weight. A general rule is to use 1 part salt to 3 parts fish. In salting, be careful not to exceed the proper proportion-an excess will "burn" the fish, lowering the quality.

Place a loose-fitting wooden cover on the top layer of the fish, and weigh the cover down. Fair-sized rocks or bricks, thoroughly washed, make good weights. The fish will form its own brine. Small fish like spots or croakers may be "struck through," or completely brined in 48 hours; thicker, larger, fatterfish will require 7-10 days.

At the end of this time, the fish are removed, scrubbed in a fresh-saturated brine with a stiff bristle brush, then repacked with a very light scattering of salt between layers. Layers must be pressed down well. Fill the container with a fresh saturated salt brine and store the container in a cool dark place. After 3 months, or at the first sign of fermentation (especially if the weather is warm) change the brine again. Brine-cured fish should not be expected to remain in good condition for more than nine months.

HERRING

Since herring are more easily obtainable by people living near the seashore in the North Atlantic or Pacific regions, they are one of the most important fish for curing. Brine-curing them requires a separate discussion, however, as methods of cleaning, packing and curing differ in certain procedures.

Herring intended for brine salting must be strictly fresh and in good condition. Thin or small fish should not be used. Herring must be free of materials causing enzymic spoilage, and should not be bruised or crushed. Ice must not be used if a salted product of good quality is desired. Instead, the fish should be cured immediately on landing.

The herring may be brined whole (without cleaning), or may be gibbed-that is, cut through at the throat, removing part

of the viscera without cutting the belly. In gibbing, one takes hold of the herring by the middle with the left hand, thumb on one side of the head, the fingers on the other, leaving the throat clear. A small short-bladed paring knife is stuck through the gills, just under the gill cover and with the edge of the blade toward the gibber, and given a sharp twist upward and outward.

If the herring are fresh and the operation is performed properly, the throat and pectoral fin together with the main gut and gills are taken out in a single motion. Before the knack is acquired, more than one motion may be required.

The herring are then thoroughly washed in sea water or salt brine, preferably the latter, stirring the fish about. This operation removes scales and leaches the blood from the fish. After washing, the fish are drained for about 10 minutes, or until all the excess moisture is removed, thrown into a shallow box of fine salt, and stirred about until all the salt possible clings to them.

Scatter a very thin layer of salt on the bottom of the container that you know will be free of leaks and very tight. Pick up the herring with as much salt as will cling to it; place it straight against the side of the container, back down. Place two others in front of the first, their heads touching the side walls of the container, one to the right, one to the left, straight on their backs, belly up, and packed as tightly as possible. Place a fourth herring in the middle between the two; and the two others' heads to the side walls as before. The head ends of the herring should be alternated.

Continue to pack in this fashion until the layer is completed. The rows must not be irregular, and the fish must not be packed on a slant or they will not be salted evenly. The space at the sides of the container where the heads touch must be filled. Two herring are placed with their heads pointing in opposite directions. This leaves an even surface for succeeding layers. Enough salt should be scattered on top so that the layer is just covered.

Begin another layer. Pack each layer at right angles to the

preceding one. The top layer should be packed with the backs up and salted a little more heavily than the other rows. Fill the container with fresh 100% brine and close tightly. Store in a cool, dry place. The brine should be changed at 2-month intervals if the fish have not been used up. Fairly fat herring will require a total of 35 pounds of salt for 100 pounds of fish.

DRY SALTING

Dry salting is the method of fish curing best adapted to warm climates, but also is widely used by non-commercial fish curers in the northern areas. Nearly all fish may be used, although fatty fish are much more difficult to cure and keep a shorter period of time. As a rule, properly dry-salted fish keep for a longer period of time than when brine salted. This depends, however, on the temperature, humidity, percentage of moisture remaining and the care used in preparation and storage.

The method generally used is the same, but there are many local modifications. The method given here is especially descriptive of the home curing of cod, haddock, hake and pollock, but is applicable to most large non-fatty fish. Variations necessitated by differences in species or by local conditions are discussed later in this book.

The fish are bled by cutting the throat and pulling out the gills as soon as caught. This results in a much lighter-colored flesh in the finished product. When the fish reach shore they must be thoroughly washed. Then the head is cut off, but the "lugs" (hard bony collar plates) must remain. If not, the fish will shred during curing or afterward in handling.

Cut down the left side of the backbone, with the knife edge at a slight downward slant, so that it scrapes the backbone. If the knife blade is held level, much flesh is left on the backbone. Continue down to the tail so that the upper side is removed in one piece. Then insert the edge of the knife blade just below the end of the backbone at a slight upward angle, and cut down to the tail. The fish now is separated into two sides of fillets. If the cutting is done correctly, the sides will be perfectly smooth with practically no flesh left on the backbone.

Another method especially adapted to smaller fish from 2-5 lbs. is to cut down the middle of the belly to the vent (anal opening). Lay the fish on the edge of the table so that the head overhangs. Grasp the head and give a quick downward jerk, which removes the head more quickly and easily than by cutting.

With the fish lying on its side, cut above the backbone from neck to tail holding the knife horizontally and working from the belly side. This cut must not be too deep. It must not go through the back skin. Next, cut the backbone below the vent (leaving about one-fifth of tail section as a hinge). Cut forward just below the backbone to the head, thus removing it. Make another cut below the remaining section of the backbone in the tail section, so that salt may penetrate. The fish should now lie open in one piece.

After the fish is split, rub the inside of the belly cavity with a piece of coarse sackling to remove the black skin and to clean any blood, membrane and bits of viscera. Place the fish in a tub of water, wash, and brush thoroughly with a stiff bristle brush. Only pure, fresh drinking water should be used. Brine made in the proportion of 1 cup salt to 1 gallon of water is preferable to plain water. Afterward, drain the fish to remove surplus moisture.

Dredge the fish in a box of salt as in brine salting. Stack the fish in rows on the floor, choosing a place where the brine formed will run away to a drain. First, scatter a thin layer of salt on the spot where the fish are to be stacked, and arrange them in place by alternating heads and tails. Scatter a little salt between the layers of the fish. Fish are piled flesh side up except for the last layer, which is piled skin side up. The average amount of salt used is 1 pound to each 4 pounds of fish.

The fish are taken out of the salt in 48 hours to one week, depending upon the size of the fish and the weather. In damp or stormy weather, they are allowed to remain in the salt, as it is useless to attempt drying. Less time is required for salting in warm weather.

When the fish are ready for drying, they should be scrubbed in brine to remove all excess salt and dirt. No trace of salt should be visible on the surface. After draining 15-20

minutes, the fish are ready for the drying racks. These are frames of wood covered with chicken wire and standing on legs about 4' high. A slat top of thin poles or laths may be substituted for wire mesh, if a 2" space is left between the laths. The drying racks must be placed on dry ground, preferably covered with gravel.

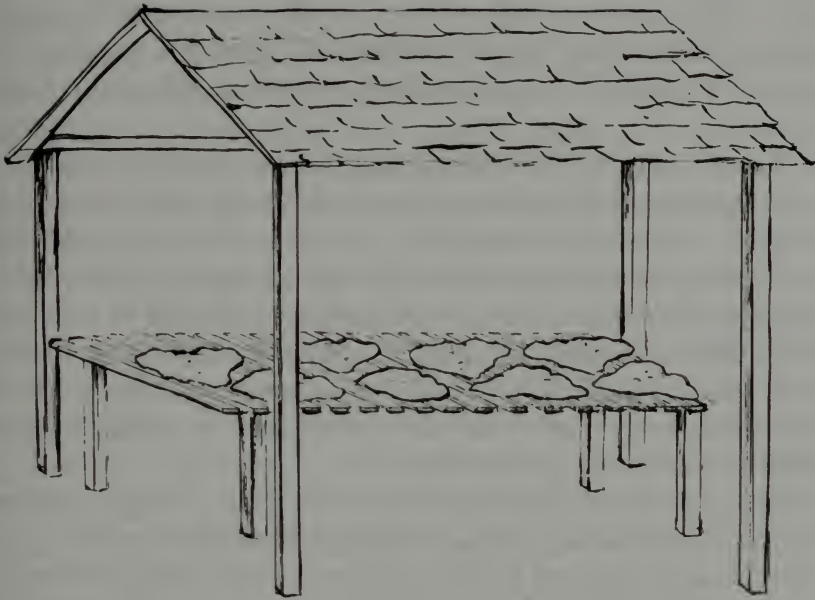
Oxidation or rusting of the fish occurs most readily if they are dried in direct sunlight. If the fish are kept in a breezy location, they dry well with a clear color. For this reason, drying is best done in the shade under an open-walled shed ventilated by air currents. If only a few fish are being dried, they may be hung under over-hanging eaves, or from the rafters of a shed or a barn where there is good cross-ventilation.

If placed on racks, the fish are laid skin side down, but should be turned 3-4 times the first day. They should be gathered up and stored each night, for they sour and mold if left spread out in the open. The fish are stacked in rows, alternating heads and tails, flesh side up except for the top layer. No stack should be more than 2' high, and there should be a rack at the bottom to prevent contact with the floor.

Each stack should be weighted down evenly, the weights at least equaling that of the fish in the stack. Additional moisture is pressed out of the fish. If the fish cannot be taken out to dry the next day because of unfavorable weather, they must be repiled at the close of the day, placing the top layers of the fish at the bottom. If the weather continues to be unfavorable for drying, the fish are left in the stacks, but are repiled every other day with a small amount of fine salt (about 1 lb. to 10 lbs. of fish) scattered between layers.

A smoke smudge under the drying racks may be necessary for at least the first day, to keep flies from the fish. The smudge should be made of green wood, or a wood fire smothered by green branches. Resinous woods such as pine or fir must not be used.

The time for drying depends upon the weather conditions, the size of the fish, and the length of preservation desired. Fairly large haddock, hake or pollock must receive 60 hours of air drying-about 6 good days of drying. The usual test to determine sufficiency of drying is to press the thick part of the flesh



Drying shed and rack for dry salting fish.

between the thumb and forefinger; if no impression can be made, the fish are sufficiently dried.

The cured fish are wrapped in wax paper, packed in a thin wooden box, tightly covered, and stored in a cool, dry place. At the first signs of rust, mold or reddening, scrub the fish in a salt brine and dry in the air for a day or two.

BARRACUDA

Remove the head, leaving the collar bones, slit down the middle of the belly to the vent and clean the body cavity thoroughly. Make a cut just above the backbone on the abdominal side, cutting along a line where the rib bones join the backbone, and continue the cut to the tail. Hold the edge of the blade at a downward angle so that no flesh is left on the backbone.

A similar cut is made just below the backbone. A sweep of the knife through the cut section of rib bones still adhering to the flesh removes the backbone, which is broken off near the tail. These cuts must not reach through to the skin. When splitting is completed, the barracuda should lie flat in a single piece. After splitting, the fish is washed thoroughly in salt brine and soaked 30 minutes to remove all the traces of blood. The flesh is scored to the skin, the cuts running longitudinally from collarbone to tail.

Fine salt should be rubbed into the flesh, the fish packed flesh side up in tubs. Scatter sufficient salt between the layers to cover any exposed surface. Place a loose-fitting cover on top of the fish with sufficient weights to keep all fish under the surface after the brine has been formed.

After 48 hours, remove the fish, scrub well in brine and dry one day as described previously. At the end of the day, the fish should be repacked in layers between thick layers of clean sacking, alternating layers of fish and sacking until the stack is completed. Weigh down the stack as heavily as possible. The next morning dry the fish for a second day. After 40 hours or 5 days of air drying, the fish should be sufficiently dry.

DRUM OR CHANNEL BASS

Split the fish in two sides, removing the backbone. Each side should be scored through the flesh longitudinally (from neck to tail), the cuts penetrating almost to the skin and about 2" apart. Wash the sides thoroughly in salt brine to remove all the traces of blood or other waste, and drain for about 20 minutes.

Dredge the sides in a box of fine salt, rubbing salt thoroughly into the flesh and especially into the cuts. Pack in even layers in tubs, flesh side up. Scatter a little more salt between each layer, and weigh down the top. Fill the tub with a saturated salt brine. The fish are allowed to remain in the tub about two weeks.

Take out and scrub the fish thoroughly to remove any blood spots, black skin, or excess salt. Stack the sides in a row like cordwood, but not more than 1 foot high. The bottom row should be laid skin-side down, but the other layers should be placed skin-side up. Cover the top with boards and weigh down with rocks.

The second day the fish are restacked, reversing the layers. The third or fourth day, depending on the weather, the sides are placed on racks in the shade for about 8 hours of air drying. The flesh during the first day's drying should not be exposed to the direct sunlight, since a crust would form that would prevent the removal of moisture from the inner flesh. At the end of the day, the fish again are stacked as before and heavily weighed down. They remain in the stack for two days, after which they are given a day of drying. Then they are repiled and given two days of pressing.

The process using one day of drying followed by two days of pressing is continued until the fish have received about 10 days of drying. The fish are cured thoroughly when the pressure of a thumb in the thick part of the back makes no impression.

MULLET

While small mullet are suitable for brine curing, only the larger fish, weighing one pound or more, make a good dry-salted product. The heads are first removed, leaving the collarbone. They are split mackerel-style, along the back just above the backbone. When the knife is drawn toward the tail it must not go through the skin so that the lower half is cut in two. A cut is made under the backbone and the flesh is scored longitudinally on both sides. Intestines, black skin, and blood must be cleaned out. Scrubbing with a piece of coarse sack-ing canvas is the most effective means of removing black skin

and blood from the fish.

The clean fish are washed thoroughly and dropped in a tub of salt brine made in the proportion of 1 lb. salt to 1 gallon of water. They should be allowed to soak in the brine for 30 minutes to remove all the traces of blood from the cut flesh. After brining, the mullet are drained for at least 20 minutes to remove surplus moisture.

Fill a shallow box about 2 feet square with salt, usually a dairy-fine grade. The drained fish are dredged in this salt, and the salt is rubbed into the slashes of the flesh. A thin layer is scattered over the bottom of a tub. The fish are then picked up with as much salt as will cling to the body and packed in even layers in the tub, flesh-side up, each layer at right angles to the preceding one. A small amount of salt is scattered between each layer.

A loose-fitting cover is placed on top and weighted sufficiently so that the fish will be covered by the brine formed. In warm weather, a saturated brine may be added immediately, instead of allowing it to form gradually by extracting moisture from the flesh. The amount of salt used should not be more than 3 lbs. per 10 lbs. of fish.

The mullet should be sufficiently salted in about 36 hours, after which they should be removed from the brine. Scrub thoroughly to remove any traces of excess salt, and place in layers, flesh side up (except for the top layer), on a low rack. The stack should be weighed down to press moisture out of the flesh, and the next morning the mullet should be hung in a shady spot where there is a good breeze or should be dried on racks as previously described.

At night they are restacked and weighed down, and set out to dry again the next morning. A small amount of salt is sometimes scattered between the layers in stacking, but any excess salt must be brushed off before the fish are taken out to dry.

In good weather the mullet will be sufficiently cured in 4 days; in unfavorable weather, and for the largest fish, more time may be required. When dried, each fish is wrapped in waxed paper, packed in a tightly covered wooden box, and stored in a cool, dry place.

SHARK

Curing must begin within the shortest possible time after catching, as spoiling occurs more rapidly with shark than in any other species. The shark is gutted and skinned, after which the carcass is split into two sides, removing the backbone. The large streak of dark meat along the middle of each side must be cut away, dividing each side into two fillets of light-colored flesh. The individual fillets may be further divided into two or more pieces if the shark is very large. The individual fillet, or piece, should not weigh more than 5 lbs.

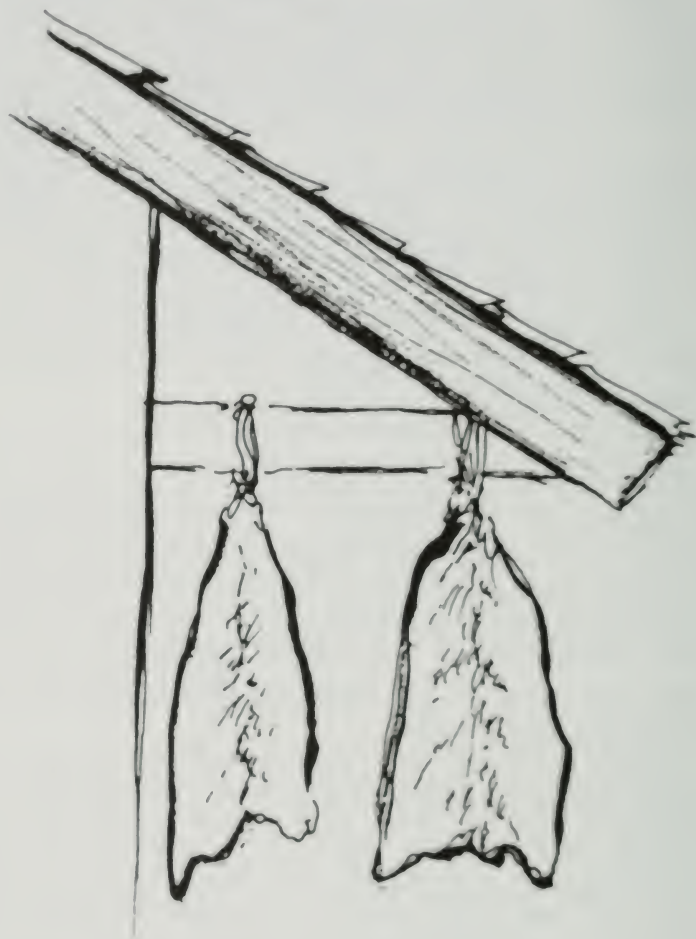
Each piece then is scored lengthwise with a knife on both sides. The pieces are dropped into a tank of saturated salt brine to soak for about 1 hour.

The fillets are drained of excess moisture, rolled around in a box of fine salt, and the salt rubbed well into the slashes in the flesh. They are packed in layers at right angles to each other in a tub, with a scattering of salt between each layer of fish. The top is weighted to keep the flesh below the surface of the brine which is formed. They remain in salt from 5-10 days, depending on the size (larger pieces requiring more time), and weather. The fillets are kept in the salt longer during unfavorable weather.

When the meat has been sufficiently salted, the pieces are scrubbed thoroughly in fresh brine and laid in small heaps to drain for 2-3 hours. They are hung out to dry in a shady location having a good breeze, or are laid out on racks. Drying under the direct rays of the sun is apt to discolor the flesh, especially during the first days of the drying period.

At the end of the day's drying, shark fillets are piled up in small heaps with weights on top equivalent to about half the weight of the fish. The next day the fish are again dried and in the evening stacked under weights with the amount of pressure somewhat increased. The pressure is increased until it is about three times the original weight of the fillets, and curing is complete. This requires about 10 days. The fish are hung in a light smoke (the smokehouse temperature should not exceed 80° F for one day (about 10 hours). The last step can be eliminated in good drying weather. Shark fillets are

wrapped in a wax paper with a scattering of fine salt, and packed tightly in covered boxes.



Drying a row of fish under overhanging eaves.

FISH ROE

A very good home substitute for caviar may be made from the roe of several types of fish, especially mullet, herring, chad, drum (or channel bass) and striped bass (rock). The roe must be fresh, and the skin of the roe must not be broken. The lobes of roe are first freed from blood, gall bags, and bits of intestine or black skin. After washing, the roe is allowed to drain for about 30 minutes, and rolled in fine salt. Two pounds of salt to 10 pounds of roe should be sufficient. Too much salt should not be used, as it will break the egg sacks.

The roe is taken out of the salt after 12 hours and brushed to remove any excess. The pieces are laid in direct sunlight, usually on a shed roof. During the first day of drying the roe is turned every hour. At the end of the day, it is stored indoors. Any moisture falling on the roe after drying has started will spoil or at least damage the product. Boards and weights are placed on the roe for the first night or two so as to slightly compress them.

Drying requires about one week under good drying conditions. The drying is completed if the roe feels hard when pressed between the thumb and forefinger, and when yellow to red-brown in color. The dried roe is dipped in melted beeswax. After cooling about 15 minutes, they are wrapped in waxed paper, packed in a wooden or tin box, and stored in a dry, cool place.

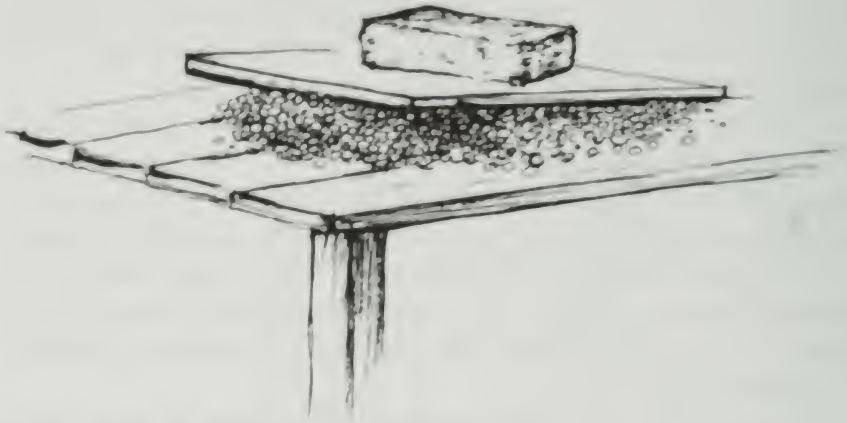
The roe is sliced thin, like sausage, and eaten without further preparation as an appetizer or relish.

DRYING

The curing of fish solely by drying in the open is not practiced in this country. This is because the weather is not suitable in many localities, and because the flesh of many species available to the non-commercial fisherman has a fat content of 5 percent or more, making it difficult to dry by air alone.

Another reason is that a combination of salting and drying

requires much less time than air drying alone. In the North Pacific and the Atlantic states (and for shrimp drying, in the Gulf of Mexico area) air drying offers some possibilities for those wishing to preserve fish at home.



Pressing mullet roe during drying process.

ROCKILING

This is a product introduced to this country by Scandinavian fishermen who prepare it for home use. Large flounder, halibut, pollock, musk, hake, rock cod, or similar fish with a fat content of about 2% are suitable.

The fish are beheaded, leaving the collarbone, and split in two sides, removing the backbone. The sides are cut in long narrow strips, about an inch in width, and left joined together at the collarbone. They are washed thoroughly (all traces of blood must be removed) and soaked in a saturated salt brine for one hour.

They are hung out to dry, preferably in a shady place where they will not be exposed to direct sunlight. Drying requires from 1-2 weeks. When wanted for use, the rockling may be soaked for a few hours, steamed, and made into fish cakes, fish loaf, or creamed fish. It is most often eaten like jerked meat, however, without any preliminary preparation.

DRIED SHRIMP

Small shrimp not suitable for the commercial market, or large catches which cannot be used fresh, may be dried at home. The shrimp are first washed thoroughly, picking out all bits of seaweed and other waste and allowed to drain.

Prepare a salt brine in the proportion of 1/2 cup of salt to 1 quart of water. Bring to a boil. Put in whole washed shrimp. Allow them to boil for about 10 minutes, counting from the moment when the brine begins to boil after the shrimp have been added. When the meat has separated from the shell, it is cooked, which may be determined by breaking open a shrimp.

Spread the boiled shrimp in a thin layer to dry in the sun. A slanted shed roof makes an excellent drying platform. The layer of shrimp must not be more than one inch thick. Turn them at half-hour intervals the first day of drying, so that all parts of the layer will be equally dried.

The shrimp are gathered at night and stored in a dry, well-ventilated area. This must be done at the first sign of rain.

Do not place a covering directly on the shrimp or they will start to heat up and sour.

Drying requires about three days if the weather is good, longer if drying conditions are unfavorable. When the shrimp are thoroughly dry and hard, place them in a sack. Beat the sack with a board. This separates the shells from the meat.

Then take a wooden frame, wire mesh screen with 1/4" mesh and set it up at an angle. Shovel the mixture of meats and shells against the screen as in sifting sand. The bits of shell and waste fall through, while the meats roll down to the bottom of the screen. From 100 lbs. of green shrimp, 12-13 lbs. of dry shrimp should be obtained, with an equal amount of shells.

The dried shrimp meat may be soaked in water for a few hours, wiped dry, rolled in butter or oil, and fried. They also are excellent in curries, gumbos, and jambalayas. When the dried meats are ground and mixed with butter and spices they make an excellent sandwich spread. The dried meats are also used with beverages as appetizers.

SMOKING

Smoking is a method which should be used much more extensively in home preservation of fishery products. When the curing is properly done, it is inexpensive and the product is of high quality, attractive in appearance and taste. Although preservation by smoking usually lasts for a shorter time than by salting, the product is much more appetizing.

If smoked fish spoils quickly and is poor in quality, it is because the smoking is improperly done. If proper attention is given to materials and methods, little difficulty should be experienced.

There are two general methods of smoking fish: hot smoking or barbecuing, and cold smoking. In hot smoking, the fish are hung near the fire usually not more than 3-4' distant and smoked at temperatures from 150-200° F, so that they are partially or wholly cooked. Therefore, while hot smoked fish is very appetizing and requires no preparation, it will keep for only a short time.

In cold smoking, the fish are hung at some distance from a low smoldering fire and cured at temperatures of less than 90° F. Degree of preservation depends on the length of time the fish are smoked; fish smoked a few hours, for example, will keep only a short time. If an extended period of preservation is desired, fish must be cold smoked from a few days to a week or more.

HOT SMOKING

GENERAL METHOD: This process may be used with almost any species-herring, shad, trout, etc. This method is recommended if it is desired to prepare a fish that may be used immediately, without cooking. It may be kept longer without molding or souring, but even so, it will preserve for only a short time.

Split the fish along the back, just above the backbone, so that it will be open in one piece, leaving the belly solid. Scrape out all viscera, blood and membrane. Make an additional cut under the backbone for the smaller fish. For the larger fish, cut out the forward 3/5 of the backbone.

Wash thoroughly and soak in a 70 degree F. salt brine (1/2 cup salt to one quart water) for 30 minutes to leach out blood in the flesh. Then prepare a brine using the following ingredients, dissolved in 2-1/2 gallons of water: 2 lbs. salt (fine grade), 1 lb. sugar, 2 Tb. cure, 12 Tb. crushed black peppers, 5 Tb. crushed bay leaves. This is made up into a 90 degree F. brine solution.

The amounts of ingredients are increased in proportion to the amount of brine to be made. Spices may be increased or decreased according to individual taste.

The fish are held in the brine for a period of 2-4 hours, depending upon their thickness, and the desire for a lightly or heavily cured fish. If brining the whole fish (up to 2 lbs.), keep in brine for 24 hours under refrigeration of 38-40° F. Weather conditions also make a difference; the exact length of time must be determined by experiment. Rinse off the fish in cold, fresh water and hang outside in a cool, shady and breezy place to dry for about 3 hours before hanging in the smoke-house, or until a thin shiny "skin" or pellicle has formed on the surface.

After drying, place fish into a preheated smoker at 130° F applying heavy smoke. When fish starts to turn brown the smoker temperature is increased to 170° F and held until fish is golden brown. The fish is fully cooked when it flakes. For deeper brown and a smokier flavor, liquid smoke may be added to the brining process. The amount of liquid smoke

added is decided by personal taste. A starting point could be 1 tsp.

When smoking is finished, the fish must be cooled for 2-3 hours. They may be brushed over lightly with vegetable oil (usually cottonseed) while warm. This is sometimes done just after finishing the cold- smoking part of the process, before the temperature is increased. It gives a more attractive appearance and a light protective coating. Each fish should be wrapped in wax paper and stored in the refrigerator. Spoilage occurs more rapidly if the fish are stored in a warm place or in a cold damp place.

SMOKING EELS

Eels need not be skinned or beheaded for smoking. If you wish you may remove the head, split the abdominal cavity and remove the viscera. Eels should be cleaned thoroughly and placed in a strong brine for one full day. Remove and wash very well.

Eels are placed in a 130° F smoker for about 2 hours, using gentle smoke. Increase smokehouse temperature to 165° F with a dense smoke until internal temperature of meat is 155° F at the thickest part of eel. When possible use corn cobs to smoke eels, along with regular hardwood sawdust.

FINNAN HADDIE (Smoked Haddock)

Haddock should be cleaned and washed. The fish then is split in two from head to tail. Make a strong brine and allow the fish to season for a couple of hours. Salting depends on the size of the fish and the flavor desired. Place in smokehouse and allow to dry for 3-4 hours at a temperature of 80-85° F.

After this period, allow to smoke for about 16 hours with a light smoke. Smoking then is continued for 5 more hours using a very dense smoke. Be sure you maintain 80-85° F at all times. Remove from smoker and let cool overnight.

SMOKED HALIBUT

When using a brined halibut half for smoking, be sure it is washed thoroughly in cold water. This will take at least 8 hours. Remove and permit to drain for 3-4 hours helping along by compressing excess moisture while on the rack.

Spread out on a rack used for dry salting fish and allow to remain for 2 days in dry weather. A longer time is required during damp weather. Fish then is cut up into smaller pieces, placed into a smokehouse, and kept there for about 5 days at 75-80° F using a moderate, dense smoke. When this process is completed, 100 lbs. of fish will yield 30 lbs.

SMOKED MACKEREL

Fresh mackerel are cured without cleaning and salted in brine for about half a day. After this period of time, they are removed from the brine and allowed to drain. The vent of each fish must be opened to allow excess brine to drain from the cavity.

Place in smoker at 75-80° F and allow to further dry and smoke for about 5 hours. After this period, increase temperature to 220° F and let cook for 2 hours using a dense smoke. Remove and let cool before using.

SMOKING CARP

Clean fish well by removing head, fins, skin and scales. Fish then is cut up into pieces 2-3" wide. Place into 90 degree salinometer brine and remove after 12 hours. Fillets are then placed into fresh water to remove all excess salt and slime.

Place in smoker at 100° F with dampers wide open until fish has begun to dry, using a gentle smoke. Temperature then is increased to 170° F with dampers 1/4 open using a dense smoke until internal temperature or thickest part of meat is 160° F Remove from smoker and let cool overnight before using.

HARD SMOKED SALMON

Split fresh salmon into 2 sides, removing the backbone. After cleaning and washing, fish is salted in a container for about 4-5 days. Remove and soak in fresh water for 3-4 hours to remove excess salt from fillets. If you are going to smoke a dry salted salmon, you must allow the salmon to soak for at least 48 hours before smoking. Fish are then allowed to drain, helped along by pressing out the excess moisture (water horsing).

Fillets are then placed into the smokehouse and allowed to dry for about 3-4 days. Be sure all dampers are open to allow good circulation and you must maintain a low temperature of around 75-80° F. The fillets must be allowed to form a

pellicle (a glossy brown surface).

When the fillets are properly dried, the dampers are closed to 1/4 open and allowed to smoke for 5-6 more days using a medium dense smoke. Smoke salmon up to 10 days if you want a hard-dried smoked salmon that will have good keeping qualities. Be sure smoker temperature never exceeds 75-80° F.

KIPPERED SALMON

To make kippered salmon you may use either the red or white meat fish. After cleaning and washing, cut into pieces 5-6" long and about 3" wide. Fillets then are placed in a strong brine to season for about 8 hours. Remove and let drain. Place fillets in the smokehouse and allow to dry for 15-20 hours maintaining a temperature of 70-80° F, using a gentle smoke. Do not allow to overheat beyond these temperatures. (These temperatures are easily maintained if you are using a smoker that has a vent in the top and a damper in the bottom.)

After this period, bake the fish at about 220° F for at least a half-hour or until the thickest part of the fish has an internal temperature of 160° F. When cooked, remove to cooler overnight before using.

NOTE: Freezing the fish before smoking allows you to have a much firmer product, since it helps to remove the moisture. It also is popular to dip fillets into harmless vegetable oil after brine-seasoning the fillets.

COLD SMOKING

GENERAL METHOD: Small fish, such as herring, may be coldsmoked in the round (without cleaning), but they should be gibbed. Gibbing is making a small cut just below the gills and pulling out the gills, heart and liver, leaving the belly uncut. Fish larger than 1 lb. should be split along the back to lie flat in single piece, leaving the belly portion uncut. All traces of blood, black skin, and viscera must be removed, paying special attention to the area just under the backbone.

The head does not need to be removed. If the head is cut

off, the hard bony plate just below the gills is allowed to remain, as it will be needed to carry the weight of the fish when it is hung in the smokehouse.

Wash the fish thoroughly and place them in a brine made in the proportion of 1 cup of salt to 1 gallon of water. They should be left in the brine at least 30 minutes to soak out the blood diffused through the flesh. At the end of this time, rinse in fresh cold water and drain for a few minutes.

Drop each fish singly in a shallow box of fine salt, dredged thoroughly. The fish is picked up with as much salt as will cling to the body and packed in even layers in a box or wooden tub. A small amount of salt may be scattered between each layer. The fish are left in salt from 1-12 hours depending upon weather, size of fish, fatness, length of time for which preservation is desired, and whether the fish are split or round.

Salting is an essential feature in smoking, as smoking is not a sufficient preservative in itself. Unsalted fish usually will sour or spoil under temperature and humidity conditions found in the smokehouse before they can be cured. Fish such as halibut, herring, mackerel, or salmon may be smoked after being held in salt for a year. In these cases the excess salt is removed by soaking the fish in fresh water. Fish given a heavy salt cure and held in storage for some time before smoking are not so desirable in quality as those given a light salting and smoked immediately.

When the fish are taken out of the salt, they should be rinsed thoroughly. All visible particles of salt or other waste should be scrubbed off. They are hung to dry in the shade, as direct sunlight causes rusting of the fish. If the fish are kept shaded in a breezy location, they will dry well with a clear color. If only a few fish are being dried, they may be hung in a shady undercover area where there is good cross-ventilation. An electric fan may be used if there is not much breeze. Drying racks may be made with chicken wire; the fish are placed skin-side down and turned. They will dry on both sides, but the impression of the wire detracts from the appearance.

The fish are dried until a thin skin, or pellicle, is formed on the surface. This should take about 3 hours under average conditions. If smoking is begun while the skin still is moist, the

time required is longer, the color will not be as desirable, the fish will not have as good a surface, and will steam and soften in smoking. In damp weather, fish sometimes are dried by hanging in the smokehouse over a low clear fire with little smoke. But the use of electric fans or blowers is a better procedure.

A low smoldering fire is started an hour or two before the fish are hung in the smokehouse. The fire must not give off too much smoke during the first 8-12 hours, if the total cure is 24 hours, or for the first 24 hours, if the cure is longer. The temperature in the smokehouse should not be higher than 90° F in northern states and the Pacific Northwest.

If available, a thermometer should be used in controlling smokehouse temperatures; if not, a simple test is to insert your hand in the smokehouse-if the air feels distinctly warm, the temperature is too high.

When the first part of the smoking process is ended, a dense smoke may be built up and maintained for the balance of the cure. If the fish are to be kept for about 2 weeks, they should be smoked for 24 hours; if for a longer time, smoking may require 5 days or more. Hard-smoked herring may require 3-4 weeks.

A few general rules must be followed in tending the fire. It must be kept low and steady; where hardwood sawdust is not available, chips and bark do almost as well. The fire must not be allowed to die out at night, nor should it be built up before leaving, as this will create too much heat. It must be tended regularly during the night.

The general method of cold smoking may be used with most fish if the proper consideration is given to size, climate, humidity, salting, and other limiting factors.

FILLETS: Any white-fleshed "lean" fish which will produce fillets weighing more than 1 lb. may be used. Cut the fish in fillets, removing the backbone and skin. Cover with a 90° F. brine and hold for two hours. Remove and drain for 10-15 minutes and air-dry for 2 hours. Hang across a 3-sided smoke-stick. Cure over a fire with a fairly light smoke for 4 hours at a temperature not higher than 90° F.

Turn the fillets so that the side resting on the smokestick is uppermost, and smoke 4 hours longer. Smother the fire so that a dense cloud of smoke is obtained, and smoke until the fillets are a deep straw yellow, turning the fillets once or twice so that both sides will be evenly colored. This operation should take about 6 hours. Cool the fillets and wrap each separately in waxed paper. Store in a cool, dry place. They will keep about 10 days.

SALMON: All species of salmon, steelhead and lake trout may be smoked. The general cold-smoking method is most commonly used, but the following method gives a more appetizing product.

The heads should be cut off and the fish gutted. Split into two sides and remove the backbone. To do this, the shoulder of the salmon is forced down on a sharp-pointed nail protruding from the cleaning table to prevent slipping. Short incisions are made under the anal fin, just above and below the backbone. With the upper lug or shoulder tip of the fish held by the left hand, begin cutting at the shoulder above the backbone, holding the blade steady, with the edge at a slight downward angle touching the bone. Take the whole side off with one sweep of the knife.

If the work has been done well, little flesh will be left on the backbone, and the side will be smooth. A thin line of backbone edge should run down the center of the side. To remove the second side, a cut is made at the shoulder just under the backbone. With the edge of the knife blade resting against the backbone at a slight upward angle, give one sweep of the knife down to the root of the tail. This separates the backbone from the flesh without removing the fish from the nail. The two sides should be similar.

Wash the sides thoroughly, and trim ragged edges and blood clots. Blood remaining in the veins along the belly cavity should be removed by pressing it toward the back either with the fingers or the blade of the knife. If the blood is not removed, it will harden and discolor the flesh.

The sides are placed in a tub of 90° salinometer brine (a saturated salt solution) and chilled with ice. This removes diffused blood, makes the sides a little firmer, and stops oil from

oozing out of the flesh. The fish should remain in the brine for 60-90 minutes.

The sides should be drained for 15-20 minutes. A shallow box is filled with a salting mixture made in the following proportions:

- 2 lbs. salt
- 1-1/2 Tb. brown sugar
- 2 Tb. Instacure No. 1
- 4 Tb. white pepper
- 5 Tb. ground bay leaves
- 4 Tb. ground allspice
- 4 Tb. ground cloves
- 4 Tb. ground mace

This amount should be enough for about 20 lbs. of fish. The salmon is placed in the box, one side at a time, and dredged in the mixture, which is rubbed lightly into the flesh. The sides are packed in a tub or other suitable container, with as much of the curing mixture as will cling to the flesh. A loose-fitting cover is placed on and weighed down.

The fish are left for 8-12 hours, then rinsed and scrubbed to remove all traces of the salting mixture. The sides are fixed on hangers and dried in the air for about 6 hours. If air drying conditions are not favorable, fans may be used. Hang the fish in the smokehouse and smoke in a gentle heat (not more than 100° F) for 8 hours. Build up a dense smoke and continue the cure for 16-24 hours at a temperature not higher than 70° F. To obtain a product having the maximum of preservation, the second part of the smoking period should be 48 hours.

The fish should be allowed to cool for several hours before handling, then brushed with vegetable oil and stored in a cool, dry place.

SMOKING METHOD FOR USE BY SPORTSMEN

Fishermen who wish to preserve their catch immediately have used this method successfully. This method may be used with almost any fresh or salt-water fish.

Cut off the heads and gut the fish. A cut is made above the backbone almost to the tail. Another cut is made under the backbone, which is broken off, leaving not more than $\frac{1}{5}$ of the tail section uncut. The fish should lie flat in one piece. The flesh is scored longitudinally from head to tail, with the cuts about $\frac{1}{4}$ " deep and 1" apart. After washing thoroughly and wiping dry, the fish are rubbed inside and out with a mixture of 4 tbsp pepper to 1 lb. salt.

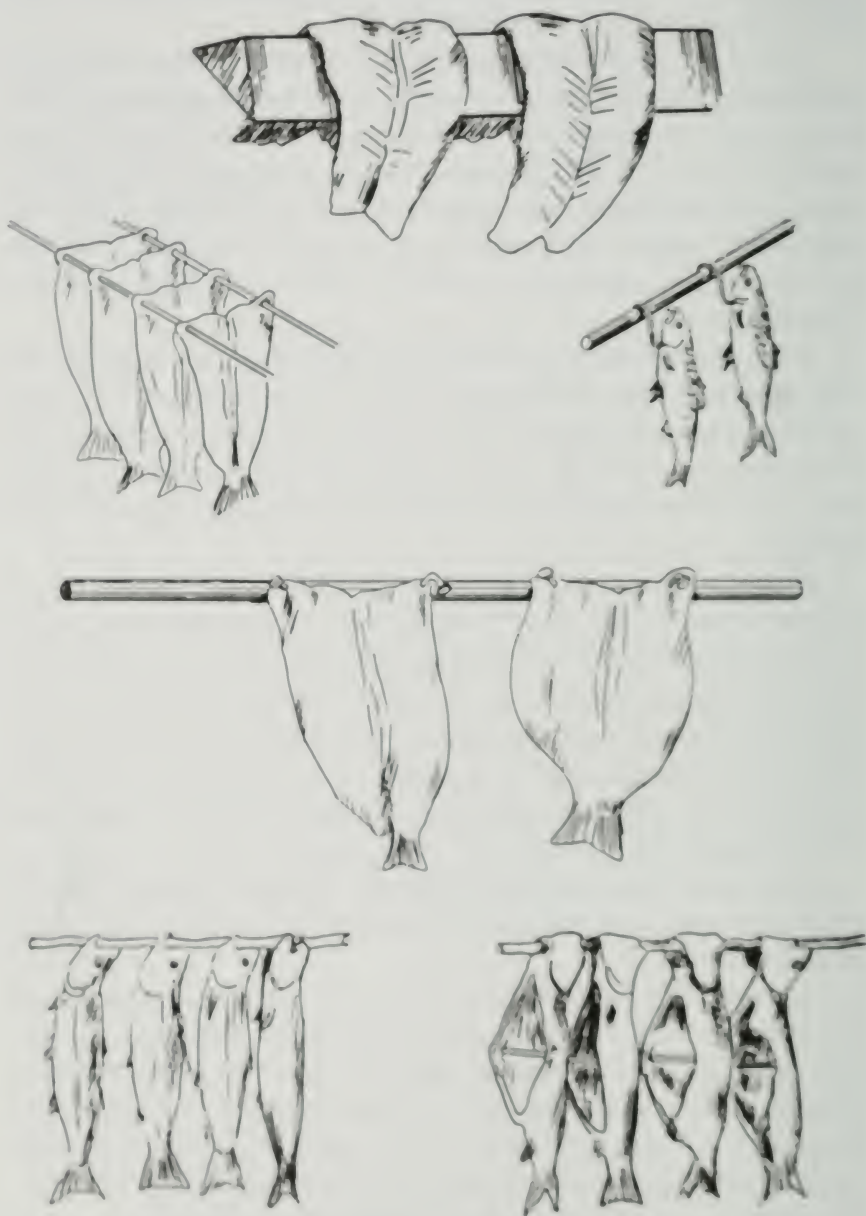
Store the fish in a cool place overnight and rinse carefully the next morning. Two or three thin, flat wooden sticks are fastened across the back to keep the fish spread open. The roughly pointed sticks pass through the skin. Dry the fish in a breezy place until the surface moisture has dried and a thin skin formed on the surface.

A shallow fire pit is dug, about 3' in diameter, and a fire is started while the fish are drying so that a good bed of red coals will be ready immediately. Hardwood should be used. When the fish have dried-about 3 hours under average conditions-each fish is fastened to the fork end of a stick, about 4-5 feet in length. The other end of the stick is thrust into the ground so that it hangs over the bed of coals at an angle. The sticks should be placed so the fish will not touch each other.

Two or three fish may be fastened across a stick and thrust into the ground, as in the first method, but must not be placed as close to the fire.

A tripod of poles is then erected above the smokesticks; on this is laid a thick thatching of green boughs and grass. A hole may be left in the thatching near the ground. Green wood is placed on the coals, building up a dense smoke, and the hole is covered. It will be necessary to place additional green wood on the fire from time to time. The fish are smoked from 6-18 hours, depending on size and degree of smoke-cure desired.

After cooling, the smoked fish are wrapped and stored in a cool, dry place. They should keep from 2-4 weeks.



Methods of hanging fish for smoking.

PICKLED FISH

While the term pickled fish is sometimes used to include fish cured in brine, it should be applied only to those products in which vinegar is used. Only a few types of fish are preserved commercially by pickling, but almost any species may be prepared for home use.

Herring is the most important fish for pickling; both sea and river herring are used. Other popular species are haddock, mullet, catfish, salmon, carp, buffalofish, eels, lake herring, lake trout, pike, pickerel and shellfish, especially shrimp, oysters, clams and mussels. Practically all other food fish, both fresh and salt water, are pickled by non-commercial, or home methods.

Preservation by this method usually keeps for shorter periods than by salting and drying. The difference may be due to local weather conditions, but depends on the species of fish (certain fish do not remain fresh as long as others), and the method of pickling.

The acetic acid content of the vinegar is also a factor. To stop bacterial growth, an acetic acid of 15% is required. The ordinary commercial vinegar contains 5-6 percent, and even this may be too strong for the average palate. Pickling solutions containing as little as 3 percent acetic acid, however, will retard spoilage for a week or more, and the product may even be preserved for months if stored in a cool, dry place at a temperature of about 50° F.

Distilled vinegar is preferred for pickling since it has a standardized acetic acid content. Cider or other fruit vinegars usually are considered unsuitable, since the acetic acid content is extremely variable and the fruit residues in the vinegar may give the fish an off-taste. Spices used in pickling should be fresh. Best results are secured by buying fresh whole spices and making up the mixture by recipe at the time it is to be used.

HERRING

Ordinary salt herring may be pickled in vinegar, but herring

not specially cured for spicing have a shorter period of preservation, are darker in color, lack flavor, are tougher and are more fibrous in texture.

The first step in curing herring for pickling is to cut off the head and trim off the thin fish belly to the vent. The herring are cleaned thoroughly, paying special attention to removal of the kidney which is the dark streak along the backbone. The fish are washed thoroughly in fresh water and drained.

Pack the drained fish loosely in a crock and cover with a brine testing to 80 degrees salinometer ($5/8$ cup salt to 1 quart water) and containing sufficient vinegar to give it an acidity of 2.5 percent. This requires about equal quantities of water and distilled vinegar.

The fish are left in this brine until the salt has "struck through," but must be removed before the skin starts to wrinkle or lose color. Length of cure depends upon the judgment of the pickler and varies with the temperature, freshness, and size of the fish. The average time is about 5 days, but may be from 3-7 days.

When the herrings are judged sufficiently cured, they are repacked more tightly. Very little dry salt is spattered around them and they are covered with a salt vinegar brine one-half the strength just stated. The crock is stored in a cool place. At this stage the fish cannot be kept for more than 2-3 weeks.

Final processes in the manufacture of spiced herring include the soaking of the herring in a tub of cold water for 8 hours. Remove the fish, drain and place in a solution of vinegar, salt and water for 48 hours. This solution is made up in the proportions of 1 gallon of 6 percent distilled vinegar, 1 gallon of water and 1 lb. of salt. Some prefer to eliminate this last step, utilizing the herring immediately after they have been freshened in cold water.

CUT SPICED HERRING

Cut the vinegar-salt cured herring across the body in pieces of 1 to 1-1/2" long. Pack in layers in a crock with sliced onions, bay leaves and spices. Cover with vinegar diluted with water in which the sugar is dissolved. Allow to stand in a cool place at least 24 hours before using.

The cut spiced herring may be repacked in pint or quart jars. If packed in jars, the herring may be stored in a refrigerator where they will remain in good condition for as long as 6 months. Add to each jar a few fresh spices, a bay leaf or two, and a slice of lemon at the side of the jar to give an attractive appearance. Rubber jar rings should not be used, since the vinegar causes them to deteriorate.

The quantities given in the formula below are sufficient for 10 lbs. of cleaned herring. Whole spices are used in all recipes, unless otherwise specified.

1 qt. vinegar	4 tsp. red peppers
2 cups water	4 tsp. white peppers
3/4 cup allspice	1-1/2 tbsp sugar
2/3 cup bay leaves	4 tsp. cloves
1/2 cup mustard seed	1 sliced onion
1/4 cup black pepper	

*NOTE: For herrings in wine sauce use 1 qt. wine in place of the vinegar and use 1 pt. vinegar in place of the water.

The vinegar-salt cured herrings are cut into two fillets, and the backbone is removed. Each fillet then is rolled around a small piece of dill pickle and fastened with a wooden toothpick. The rolls are packed on end in a crock. Sliced onions, bay leaves, and the spices used in the following sauce formula are scattered on the bottom and between layers:

Slowly cook 1 quart vinegar, sliced onions, and 1 oz. sugar until the onions are soft. Add the following:

3 tsp. mustard seeds	1 oz. cracked whole ginger
4 Tb. black pepper	5 Tb. bay leaves
1 oz. cracked cinnamon stick	2 Tb. cloves

This quantity is sufficient for 10 lbs. of cut herring. The sauce is simmered, not boiled, for 45 minutes. The spices are strained to pack with the rollmops. The sauce is cooled and poured over the fish until covered. Allow to stand for 2- 3 days before using. Rollmops will remain in good condition for about 2 weeks in summer, and from 6-8 weeks in winter, at ordinary storage temperatures. This product may be kept much longer if held in a refrigerator.

RUSSIAN SARDINES

Wash and scale 10 lbs. of small herrings (from 7-10"); remove the gills and as much of the intestines as possible by pulling them out through the gill flap without tearing the throat or belly. Rinse again, drain, and pack in a crock. Cover with 3 parts of distilled vinegar and 1 part water. Allow to stand for 12 hours. Make up a mixture of the following ingredients:

2 lbs. fine salt	5 Tb. bay leaves
1 lbs. powdered sugar	4 Tb. cloves
4 tsp. allspice	4 Tb. ginger
4 tsp. pepper	4 Tb. hops
1 Tb. Instacure No. 1	1-1/2 Tb. nutmeg

The spices should be finely ground and thoroughly blended.

After the fish have been drained, dredge them in the mixture and pack in a crock, belly up. A small additional amount of the mixture may be scattered between each layer. The layers should be packed at right angles to each other with the top one packed backs up.

Scatter the balance of the spice-curing mixture over the top layer and weigh it down so that the fish will be entirely covered when the brine forms. Some people also scatter diced onions, ground or sliced horse radish and capers between each layer. The amount required for 10 lbs. of small herring is 1/2 lb. of onions, 1 lb. horse radish and a small bottle of capers (about 2-1/2 ozs.). The fish are allowed to cure for 10-14 days before using. Under proper storage conditions they should keep from several months to a year.

HERRING IN CREAM SAUCE

INGREDIENTS

2 cups sour cream	2 Tb. distilled vinegar
2 cups sweet cream	2 Tb. pickling spice (mixed spices)
2 cups white wine dry	2 cups thin sliced onions

The above ingredients are enough for about 1 gallon of mild cured herrings. The fillets should be soaked in cold water for 2 to 3 hours keeping the melts separate. Drain fillets of excess moisture. Milts are rubbed through a fine sieve and boiled together with fillets, mixed spices, wine and vinegar. Gently boil for 5 minutes, let cool and then remove the spices. Pack fillets into a large container placing the sliced onions along as well. Blend sour cream, sweet cream with cooled vinegar, and wine and cover fillets in the container. Marinate in cool place for 4 days before using.

PICKLED CARP OR HADDOCK

Clean the fish carefully, skin, and cut into fillets, removing the backbone. Divide the fillet into 1" to 2" lengths and dredge the pieces in fine salt. Pick them up with as much salt as will cling to the flesh and pack in a crock or pan. Leave in the salt 12 hours, rinse off salt and soak in fresh water for 1/2 hour. Cook the vinegar, water, sugar, garlic and spices for 10 minutes, add the fish and cook 10 minutes longer. Pack the cooked fish in sterilized jars, adding some chopped onions a few spices and a slice of lemon to each jar. Strain the spice-vinegar sauce and bring the sauce to a boil. Fill the jars immediately and seal tight. The mixture recommended is as follows:

1 tsp. cloves	
3 cups distilled vinegar	1 Tb. allspice
3 cups water	1 Tb. mustard seed
2 cups chopped onion	1 Tb. bay leaves
1 clove chopped garlic	1 tsp. black peppers

This amount is enough for at least 5 lbs. of cleaned and prepared fish.

PICKLED EELS

Clean and skin the eels and cut into pieces 5/8 inch thick. Wash, drain, dredge in fine salt, and allow to stand for 1 hour. Rinse off the salt, wipe the pieces dry, and rub with a cut clove or garlic. Brush with melted butter or salad oil, and broil until the surface is light brown. Place pieces of cooked eel on absorbent paper. When cool, pack them in layers in a crock with a scattering of sliced onion, allspice, bay leaves, mustard seed, whole cloves, peppers and mace between layers of the fish. Weigh the mixture down to keep it compressed. Store for 24 hours. Add distilled vinegar in proportions of 3 parts vinegar and 1 part water, sufficient to cover the pieces. Cover the crock tightly and allow to stand 48 hours before using. For 10 pounds of eels the ingredients are as follows:

1 qt. distilled vinegar	1-1/2 Tb. mustard seeds
2 cups water	2 Tb. cloves
4 Tb. allspice	2 Tb. black peppers
4 Tb. bay leaves	2 Tb. mace

PICKLED SALMON

Cut 10 pounds of salmon into individual serving portions. Wash well in cold water, drain and dredge in fine salt. After 1/2 hour rinse off the salt and simmer the salmon until done. Place the warm fish in an earthenware crock and cover with a vinegar spice sauce made as follows:

1 qt. distilled vinegar	1 Tb. mustard seed
1 qt. water	1 Tb. cloves
1 cup olive oil*	1 Tb. black peppers
1 cup sliced onions	1 Tb. bay leaves
1 Tb. white peppers	

Cook the onions in olive oil slowly until they are yellow and soft. Add the rest of the ingredients and simmer slowly for 45 minutes. Allow the sauce to cool, and pour over the fish, making sure that all the pieces are covered. Allow to stand for 24 hours before using. This method may be used for mackerel, shad and other large fish. *Peanut oil or cottonseed oil may be used in place of olive oil.

PICKLED CLAMS, OYSTER AND MUSSELS

Scrub the shells well and steam just enough to open the shells. Save the liquor or nectar. Remove the meats from the shells: cool meats and nectar separately. When cool, pack the meat in sterilized jars with a few bay leaves and whole cloves. Add a slice or two of lemon to each jar.

Strain the liquor obtained in steaming. To each quart of liquor, add one-half pint distilled vinegar, one-half teaspoon each of cloves, allspice and red peppers, with a teaspoon of cracked, whole mace. Simmer for 45 minutes. When cool, pour into the jars and seal. Store in a cool, dark place. Pickled oysters and mussels become easily "light struck" and turn dark if exposed to light.

FRIED FISHCAKES

Fried fishcakes are very simple to make and provide another possibility for doing something else with an over-abundance of fish.

INGREDIENTS FOR 5 LBS.

5 lbs. potatoes, peeled and diced
2-1/2 lbs. fish
8-12 whole eggs, beaten
1/4 lb. butter
1-1/2 cups chopped onions
1 tsp. ground white pepper

The fish is shredded into smaller pieces and placed in water along with the diced potatoes. The water is brought to boiling and then reduced to simmer. Cook until tender. The water is then drained and the potatoes and fish are allowed to cool. After cooling, grind through a 3/16" grinder plate. The fish and potatoes are then placed in a mixing bowl. Mix thoroughly with remaining ingredients until evenly distributed. This mixture is then made into patties or cakes and dipped into fine bread crumbs. Deep fat fry until light brown.

LOX

Lox is a cold-smoked fish - it is not cooked, but is ready to eat after this process is finished. Lox is a great favorite of many Jewish people and can always be found at Jewish delis, restaurants or markets.

However, lox can now be found on the menus of virtually every big-city hotel in this country. It is not uncommon to pay \$10-\$15 per pound for good lox. An egg omelet with onions and lox has long been one of my favorite breakfasts.

The following recipe is one that was given to us from Mr. Gerald Cone, Suquamish, WA.

Chinook salmon is the best for making lox because it is the fattiest of the entire salmon family. However, you may substitute steel head or silver salmon with good results.

INGREDIENTS FOR 5 LBS. OF LOX

- 1/2 cup of kosher salt
- 1/2 cup of sugar (either white or brown)
- 1 tsp. ground white pepper
- 1 tsp. Instacure No. 1

Scale and fillet the salmon. Cut several slits through the skin on each fillet. Then dredge the fillets with the above mixture in a glass or plastic container. Then cover the fish with a board (preferably good hardwood), placing a weight of approximately 3 pounds on top. The fish is then left in the salt for 48 hours. The fillets should be about 3/4" thick. If for some reason they are thicker, fish should then be left in the salt longer.

After two days, remove the fish from the salt and rinse with cold water. Fillets must then be dried very well, which will take from 4-6 hours. After this period the fish will become tacky. Drying is best done on racks in a cool, well-ventilated room but kept out of drafts.

Place fillets in a cool smokehouse where the temperature will not exceed 85-90° F. It is important to maintain this temperature for at least 6 hours. Then remove the fillets from the smoker and brush them very lightly with vegetable oil while

still warm. Fillets are then placed in a cooler or refrigerator for a day or two until they become firm.

This is one of the more difficult recipes in this book. This is because you must use some sort of control to maintain the 85-90° F temperature. If you smoke the fillets at a higher temperature you will not have the flavor of lox, but rather of cooked salmon.

The raw, smoked, seasoned lox has a very definite and unique flavor. It must be cold-smoked. The commercial producers of lox can easily maintain these low temperatures, as they have controls built into their smokers.

In addition, a smoke generator is also used. The smoke is pumped into the smoker by blowing it in through a large-diameter pipe over some distance. This allows some of the heat to dissipate or cool off before it reaches the smokehouse.

CHAPTER XV

Wholesome Meat Act

THE WHOLESOME MEAT ACT

That "The Wholesome Meat Act" is one of the best pieces of legislation enacted in the 20th century. Most likely, many consumers have never heard of these new laws, which have helped to clean up the entire meat processing industry, from the smallest to the largest plants in the United States. Because of these new laws, many of the old establishments simply closed their doors and went out of business. The buildings were so old they could not meet the new requirements, and no amount of remodeling would bring them up to the new standards of "The Wholesome Meat Act."

All cities have health departments that regulate the entire food industry. A food processing plant can fall under the jurisdiction of the city, the county or the state health departments. On the surface, it would appear that it is not such a bad thing to have all these health standards of sanitation. In the past, the meat industry had to deal with three different agencies and three different sets of rules and regulations. There were no books or guidelines to go by, but what was right or wrong was up to the discretion of individual inspectors. I actually have experienced three different answers to a simple problem, from three different health inspectors of the same agency. "The Wholesome Meat Act" has helped to improve conditions.

Now the same set of specifications applies to both the state-inspected establishments and the federally inspected plants. Many of the city and county health departments have adopted these new specifications. Thanks to "The Wholesome Meat Act," we now have a book of rules and regulations that we can refer to.

This handbook clearly states how the building must be constructed in order to be able to apply for a state or federal inspection program. It probably is worthy to note that if your establishment will sell 25% or more of its products wholesale, this automatically places you under the laws of "The Wholesome Meat Act." If you do not plan to sell these amounts wholesale, the local health departments then have the jurisdiction over the inspection program in your plant. This

is quite important to know, as many people just go into a retail business and then slowly start into the wholesale business as they grow. You do not need state or federal inspection if you sell fewer than 25% of your products wholesale.

Even though the new specifications are the same for the state-inspected establishments as well as the federally inspected, there is one major difference between them.

When being inspected by the USDA (United States Department of Agriculture) you are allowed to ship your products across state lines; you cannot ship across the state lines if you have a state inspection program. Since there always is more potential to do business in another state, it then is obvious why most people choose to have the USDA inspection. Why not; it doesn't cost any more.

PROCESSING

Under these laws, there are specified times that are negotiated with the USDA for the establishments to do their processing. This usually is a simple 5-day week from Monday through Friday, consisting of 40 hours. The starting and quitting times are arrived at by mutual agreement, and it is between these hours that you are permitted to process the meat.

The USDA pays the wages of its inspectors. If there is any overtime to be worked, the establishment has to pay the wages at time and one half. These overtime wages need not be expensive, since many times there is more than one establishment that wishes to work extra hours. In this case, they simply split the cost of overtime wages among themselves, which in turn reduces the individual cost. As stated earlier, this would only pertain to the smaller cities with small processing plants. When talking about the large meat processor, there generally is more than one inspector on the premises on a full-time basis.

You can process meat a full 8 hours each day with clean-up time not included. There are many little shops that operate in this manner. They process meat for a full eight hours and then clean up for as long as it takes them. In the smaller cities, inspectors generally inspect several establishments going in and out of these plants at random to make his inspections more effective.

In each new establishment that is built according to the "Wholesome Meat Act," a private office must be provided for the USDA inspector. Even though these buildings are built to meet the requirements of the new specifications, the inspector must be there every day to see that sanitary conditions are maintained at all times and kept at the highest possible level. This includes the outside of the premises as well.

They will work along with everybody and help as many as they can. If there are any problems, it is best to get them taken care of. This makes the job easier for the inspector and the owners as well. The inspectors fill out reports each week and send them into the regional office of the USDA. These reports consist of sanitation for the past week from the particular establishments that they inspect.

Another of the inspector's duties is to check the internal temperatures of the meats that are being smoked and cooked. This generally applies to all products that are made with pork or have pork added to them. Since pork can contain trichinae from time to time, there is a USDA regulation specifying that all pork that is smoked must be cooked enough to destroy the trichinae.

These pork products have to be cooked only until the internal temperature reaches 138° F. When this temperature is reached, the trichinae are destroyed. The industry, however, usually cooks the meat to an internal temperature of around 152° F. This doesn't sound like it is much higher, but at these temperatures the meat is completely cooked. The 138° F the USDA requires would only make your meat rare or medium rare, so the 152° F makes it completely cooked.

There are times when some processors might cook the meat to an internal temperature of 160° F, but this is not often the case. The higher the temperature used to cook meat, the greater the risk of shrinkage in the smokehouse. When you are in business for yourself and you have shrinkage in your smokehouse, you then have a financial problem and it's all going up in smoke. Strange as it may seem, all the hot dogs and luncheon meats you buy at your favorite market or store are only cooked until the internal temperature reaches about 152° F.

In either case, the inspector actually has to see that this meat is cooked to the required specification, and make a report for each batch inspected. Random tests are taken with an accurate thermometer to be sure that the proper temperature is maintained. In addition, the inspector also takes a sample of the sausage and has a fat analysis made.

Another USDA specification is that sausage, hot dogs, luncheon meat, etc. may not contain more than 30% fat. In the smaller cities, these samples usually are mailed to the nearest regional office, where there will be a complete test to analyze their fat content. In the larger cities, they would most likely be delivered by the inspector the same day to an agency that would have a computer. The large manufacturers of sausage usually have their own computers to do this work right on the premises, if not right in the production rooms.

The monumental amount of sausage that a large manufacturer makes at one time just about necessitates this computer. The computer can make an analysis right on the spot and the inspector can make out the report right there. In addition, if a particular batch of sausage has a fat content that is too high, lean meat can be added right on the spot to bring it up to the required specifications.

I think that it should be brought out that the USDA is not completely unreasonable in their demands when it comes to the fat content of your sausages. If you own a small sausage kitchen and are a little high in the fat content on the analysis, they won't come in and close you down. They understand that without a computer it is difficult to keep up to this specification.

But if your analysis consistently shows more than 30% fat content, you will develop problems. A good sausage maker usually can tell when he is going over the 30% fat content. Meat can be bought today from meat packers who will give you the content you specify.

If you are going to operate a sausage kitchen under the laws of "The Wholesome Meat Act" you should know that any and all materials that will be used to process the meat must be purchased from approved dealers. Be it paper, sawdust, spices, soap or chemicals, there are companies that sell this material and have a USDA number, the same as any meat processing plant would have. Generally, the dealers have the number handy, to let you know that they are on the approved list to be able to sell their products to you.

If you don't know it the product you want to buy is

approved, ask your inspector. The inspectors usually have a book with this information, and if it's not in the book, they will get it for you. In addition, when the product arrives, the inspector will see if it is on the approved list. In fact, the inspector must check all the products entering a USDA establishment. It also is the job of the inspector to date all the boxes that contain meat when they first enter the building. This means that you have to rotate your meat and use the oldest first.

The "Wholesome Meat Act," states that new buildings must have enough lighting in the processing areas and coolers to have what is called "foot-candle power." There are no longer dark and dingy plants in operation. The buildings must now have adequate lighting, which helps to provide better sanitation and keeps dirt from accumulating.

PLUMBING

Tremendous improvements also have been made in the area of plumbing. To begin with, you no longer are able to operate a meat processing plant by depending on a septic tank for your sewage disposal. The sewage must now be fed into the municipal sewage system.

When the drawings are first made up, adequate floor drains must be provided for in the plans. Depending on what the rooms are to be used for, two or three floor drains are adequate in a small operation. These floor drains have a 4" opening and also a device with which to catch large particles of waste. This eliminates the grease traps, which are nothing more than breeding grounds for bacteria and odors. Floor drains also are allowed in walk-in coolers. This makes each room easy to clean and wash one at a time.

Along with these floor drains, the new specifications call for a separate system for the toilet, shower, and sink sewage.

In addition, these sewer lines will have built into them a backstop on the outside of the building, just before your sewers are connected to the municipal system. What this system does is prevent a backup of sewage into your building, in case the municipal system should become overloaded. A backstop is simply a round disc that is built into your sewer line which opens up with the sewage is leaving the building. If the sewage started to enter the sewer lines toward your building, the backstop would close up against a ridge in the pipe and the more pressure that would be applied on the backstop, the tighter it would stay closed.

CEMENT FLOORS

The specifications require that all floors must be poured and finished in such a manner that they have a fall of 1/8" to 1/4" per foot from all outside walls towards the floor drains. The 1/8" is really a drastic fall in a 10 ft. stretch, even though it doesn't seem so. It's a good specification and prevents water from lying in puddles, helping to breed bacteria.

After the floors are poured, the USDA has placed safety over the sanitation factor. Rather than have a smooth finish, they insist on a rough broom finish in the entire building. A broom finish makes the floors rough and easier to walk on, but a little harder to clean. There are good chemicals available today that help to clean the floors easily and keep them sanitized as well.

A regular kitchen sink is not needed in a sausage kitchen. All the utensils that are used can be washed on the sausage stuffing table, since the specifications call for a mixture of hot water and steam with which to wash all the equipment. Steam by itself will not wash anything. You need the volume of the hot water to blast off the unwanted particles.

If you can make an adjustment on the hot water tank to

heat your water to 180° F, you need not bother with steam. If you are going to cook sausage, however, you would be wise to have the steam installed, since steam cabinets are the best way to cook sausage and the fastest as well.

Elimination of a kitchen sink should not be confused with the wash room sinks, because a sink is required in each room and they must be of the type operated with a foot or knee-type lever. Conventional bathroom sinks are not allowed, because the handles on the faucets will breed bacteria.

Frankly, it's a good idea to confer with the USDA people before you buy equipment of any kind. It also should be noted that the USDA will approve used equipment that is in good condition, so don't get the idea that all equipment must be bought new.

I generally have covered the more expensive parts of building a structure to get USDA approval. There are a number of other items: air curtains on all outside doors, and smooth finished inside walls, for example. If you are intent on opening a meat processing plant, these are some of the requirements you must meet today. It would be best to contact a meat inspector at one of the locally- inspected processing plants or your nearest local health department. All health departments are aware of "The Wholesome Meat Act" today.

CHAPTER XVI

Opening a Sausage Kitchen

OPENING A SAUSAGE KITCHEN

After writing *"Great Sausage Recipes and Meat Curing"* and tens of thousands of copies later, I've been deluged with letters. A great number of these letters were from people who wanted to start a sausage-making business. These people found out how good home-made sausage could be, and that it really wasn't all that difficult to learn. Many of these people started to sell their products, especially when they discovered they could make a better and a much cheaper product than they could buy in a market.

They also found out that they were making quality sausage that wasn't available in the markets. They had no competition to speak of, so why not sell some to their friends? They also found that their quality products commanded a better price as well.

One thing leads to another, and the next thing you know these people are running a small business out of their homes and these people write or call and ask my advice on starting a sausage kitchen in their area. There are quite a number of things involved before you open a sausage kitchen in your area.

First of all, the most frequently-asked question is, "Do you think I can make a go of it in my area?" It just isn't possible for me to make such a prediction, or even encourage someone to open a business of this nature. The person or persons wanting to open such a business must do some research.

One of the first things to consider is whether anyone else in your area has the same idea as you. When I first opened a sausage kitchen in Las Vegas, we almost lost the business. We took so long in opening, by doing most of the work ourselves, that another sausage kitchen opened and almost put us out of business.

It is best if you can open your business and establish yourselves with a quality product. Most businesses of this type have to apply to a health department or building department to get various permits or approvals for equipment that will be purchased. It is worth your time to check this out.

If there is another sausage kitchen already in your area,

what then? The big question is can the area support more than one sausage kitchen? What kind of products does the other sausage kitchen produce? Will you produce better products? It is best not to compete; make quality sausages and stick with them. Don't make the same products the other sausage kitchen is making unless you know yours will be superior-not better but superior. That's what it takes in business.

If you think the area can support another sausage kitchen, you have to know how much sausage you'll be able to sell each week. This is extremely important! You have to plan on spending some money to advertise so that people know you exist. You can only get a small amount of help from your friends by word-of-mouth. If you can't afford some advertising, it's a lost cause.

Opening a sausage kitchen may be able to get you a free plug on TV. A food editor from the local newspaper may come over, take some pictures and run an article about you.

But again, you have to continue some sort of advertising. Free plugs aren't seen by everyone in your area so don't plan on people running over to your store. They're not going to break the doors down to get to you.

The original question still hasn't been answered. How much sausage can I sell? The best way to approach this is to sit down with a pencil and paper and figure out some of the costs on a monthly basis. You'll have to consider your wages, water, gas, phone, electric, advertising and rent costs. Maybe there are some additional items not mentioned.

You have to come up with some kind of figure; and this will tell you how much sausage you must sell to pay for your obligations. I didn't say how much sausage you can sell, but how much sausage you must sell. Hypothetically, let us say you'll pay yourself \$200 a week, or roughly \$800 a month. Let's say the rest of the operating costs will be \$1000 a month. Your total cost to operate is \$1800 a month.

Very few businesses are smashing successes from the beginning. It's an exception rather than the rule.

There is no question that you should have a reserve of

money to carry you over 6 months or so. The more money you can spend on advertising, the sooner you'll be successful. The less you spend, the longer it will take.

A husband and wife team can easily produce 100-200 lbs. of sausage in a day with minimum of work and equipment. You should only make sausages of the coarsely ground variety. Emulsified sausages like wieners or bologna immediately drive up the cost of an operation, because you have to purchase a meat chopper. You are better off purchasing emulsified sausages from another sausage kitchen that makes good products, even if you have to have them shipped in from another state. Stick with coarsely ground products and you can get by with a cooler, sausage stuffer, stuffing table, meat scale, freezer, some mixing tubs and a store fixture. These items can be bought, used and approved for use by the health department.

We mixed our meat by hand and saved several thousand dollars by not purchasing a mechanical mixer. We mixed 25 lbs of meat at a time and did a good job. The sausages were consistently good. We tried mixing 50 lbs. of meat at one time, but found ourselves working 5 times as hard with poorer results.

However, when we were able to buy our first mechanical mixer, it was like being reborn. We were then able to produce up to 1000 lbs. of sausage a day and more. But again, mixing 100-200 lbs. of meat a day is easily possible without any great strains when you're just getting started.

There isn't much more I can add to this, but I do have a few more words of advice. If you do get started in a sausage kitchen, try and visit an existing sausage kitchen. I would even offer to work there free for a week or two. This will be of immense help and will familiarize you with things I can't easily put in print for you. I would even go to another city, if need be, to accomplish this.

Don't go into the wholesale end of selling your products unless you have grown and are equipped to handle it. You wind up doing all the work and the other retailers make all the money. In addition, you'll wind up waiting for your money and getting nothing but complaints that your prices are too high or

other such things. I even had a customer spoil some of our sausages by mishandling them, and then refuse to pay me. Several customers also went bankrupt on us as well.

Stay with the retail end of sausage making; you'll do less work and make more money. If you do less work, then you're really making money. On top of all this, the retail customer pays you on the spot. I would never consider selling sausage on a wholesale basis again.

Another hint is to make a lot of fresh sausage. You grind the meat, mix it, stuff it and sell it. When you sell out what you have, you can quickly make another 25 lbs. or so in minutes. Less work simply reduces the cost of producing a sausage.

HOW I GOT INTO SAUSAGE MAKING

In past years, I've had as many people ask me how I got into sausage making as I've had ask how I got to write a book.

To begin with, there are many ethnic groups who make sausage as a part of their heritage or traditions around the Easter or Christmas holidays. The Christmas holidays have always been very special in our family-more so than any other holiday. The meat was ordered so that we could purchase it during Christmas and we usually picked it up about 2 days before Christmas. This process was followed because we only owned an ice box, and ice was not delivered during the winter months. Besides, we wanted the meat as fresh as we could get it.



My partner, Henry Kutlej, and I on opening day of The Hickory Shop in the summer of 1966.

It was only the well-to-do who could afford an electric refrigerator during the depression days of the 1930's. If we got the meat a bit early, it was usually stored in a cold room that was unheated. In colder years our little ice box was kept outside in the back yard. Since there were seven of us, we usually made 25 lbs. of sausage.

On the day before Christmas Eve, my mother would clean the casings and peel all the garlic. The meat was cut up by hand, which was my father's job, and I was allowed to chop the garlic very fine with a sharp knife. It seems like I was the only one of 5 children who took any interest in sausage making. When I got to the third or fourth grade, I was already helping to cut the meat. We simply could not afford the price of a little hand-operated grinder until the late 1930's.

The meat was then mixed well and seasoned. It was Christmas time to me as the aromas of garlic, marjoram and black pepper permeated the entire house. The meat was then allowed to season overnight and, early the next morning, it was stuffed into a large-size hog casing. The sausage was then placed in a 55-gallon drum and smoked over a low fire until 1 or 2 p.m. in the afternoon of Christmas Eve. You really knew it was Christmas.

Somewhere in the middle of our house there was the aroma of smoked kielbasa and a freshly-cut Christmas tree. These combined smells were unmistakably Christmas.

This was the beginning of my sausage-making days as a little boy during the depression of the early 1930's. As time went on and my parents got older, I was allowed to mix the meat and stuff it in the casings. Each successive year my parents taught me another step in the art of making sausage, until they could sit back and allow me to make it from beginning to end under their supervision. I learned it all-washing casings, cutting meat, stuffing meat and smoking as well.

As time went on I grew a little older and World War 11 came upon us. I was only a teenager and went to work in an A&P supermarket. After a short period, I started working as a butcher, learning to cut meat, etc. However, I had to give it up for health reasons, but not before I learned to bone meat and distinguish the cuts of meat. This was to become very useful

to me over the years-knowing how to tell a good cut of meat from a bad one.

I managed to escape the Second World War. I was just 17 when it ended, but I got caught up in the Korean War. Following my discharge after four years of service, I moved to Las Vegas, Nevada,. As you might expect, I moved to a city that didn't have a sausage kitchen. In fact, there were only four supermarkets in the area and there wasn't any need for a sausage kitchen.

At that particular time, the city of Las Vegas did not have the ethnic groups one finds in the East or Midwest. When I moved to Las Vegas, I not only gave up kielbasa, but all other Polish foods as well. I began to find out I couldn't find the good charcoal-broiled hot dogs with natural skins. On top of this, there were none of the Italian restaurants or bakeries I grew up with.

Worst of all, they never even heard of a mom-and-pop market, the type where you can phone in your order and have it delivered to your home. This type of market still exists in the Buffalo area to this day. When you unpacked your bags, everything was perfect and you never got any surprises like you do now with supermarkets and prepacked meat-nice on top with unpleasant surprises on the bottom.

However, all was not lost. I was able to have my mother (my father died while I was in the service), air-freight the sausage to me any time I wanted it. It was a little expensive to do, but it was worth it; a dollar a pound for the sausage and a dollar a pound for the air freight. However the \$2 per pound went against my frugal upbringing.

I decided one day to call my mother and asked her to mail me the recipe. She not only mailed me the recipe, but, to my big surprise, also sent along the family sausage stuffer. Needless to say, I went out and bought some meat and made a 10-lb. batch of fresh Polish sausage. It was as great as ever and I never lost the touch. I was so pleased with myself that I gave some to my neighbors and personal friends, Steve and Muriel Gresh. In addition, I gave some to my other neighbors, Wayne and Kay Puckett. They were all so pleased they couldn't wait for more.

It wasn't more than a week or so before we made another batch. As it turned out, Steve and Muriel were happy just being able to have good sausage (Steve is Slavic and their customs are similar to the Polish). But my other good friend, whom I called Puck for short, decided that I had a winner and we should spread it around Las Vegas. He figured it would be a good way to earn some extra money. He was a blackjack dealer at the Sahara Hotel and knew many people who came to Las Vegas from the Midwest and Eastern U.S. He felt sure many of these people would jump at the chance to buy this excellent sausage.

As it turned out, I had to refuse this little venture as I was working for the Atomic Energy Commission. I commuted back and forth to work each day, driving 65 miles each way. I just didn't want a part-time job on the weekend after traveling 130 miles each day. Besides, I never felt that fresh kielbasa would be as saleable as the smoked, and this was to become a big problem. I simply didn't know how to cure sausage.

Even though I helped my parents make sausage most of my life, I simply didn't pay attention to all the ingredients my father used. I knew when he made sausage it always had that nice pink color on the inside. I knew if I was to sell sausage to anyone, it would have to have that pink color in it. My mother didn't have the answer, and I didn't know anyone I could turn to. I tried smoking sausage a number of times, but never could get that nice-looking color. I simply threw the sausage in the garbage, completely disgusted because it wasn't right. All I knew was the fact that I wanted my sausage to be pink or reddish on the inside in order to be saleable.

I figured that the best thing to do was go to a library and get the information. To my dismay there wasn't a single book in the Las Vegas Library on sausage making or curing meat. Since Las Vegas was such a tiny city at the time, the logical thing to do was go to a big city that had a bigger library system. I went to the county library in Los Angeles and the public library in San Bernardino, California, and, again, there wasn't anything to be found regarding these subjects. Now what?

While in California, I decided to look through a telephone directory. When thumbing through the sausage-making ads, I

inadvertently discovered that there were companies supplying all sorts of products for sausage making. Among them were some spice companies. I didn't know it at the time, but that was the best move I ever made, as I picked out the biggest producer of spices, cures and related products.

When I contacted these people, they knew what I wanted instantly. Not only that, they loaded me up with all kinds of literature and samples and sent me on my way back to Las Vegas. They explained to me that it was a cure that I was looking for. A short time later I made a 10-lb. batch of smoked Polish sausage, and, as you can guess, it was a smashing success. The sausage was not only nice and pink on the inside, but the cure allowed the sausage to be smoked to a deeper shade of brown. I was so happy that I went next door to my buddy Puck and showed him the latest accomplishment.

We were both so happy that we immediately made plans to make 100 lbs. of sausage the following weekend. I relented, and decided to make sausage on the weekends.

After the first 100 pounds of sausage were made, Puck took it all to the Sahara Hotel and sold it all in one day. He not only came home with all the money, but more orders besides. As time went on, I got a few friends interested at the Nevada Test Site where I worked. In a short time I found myself taking a hundred pounds or more of sausage to work once a week. We were already up to 200 lbs. a week. We didn't know it at the time, but we were already starting to build a clientele. I had so many customers I had to limit them to 5 or 10 lbs. once a month because I just couldn't make enough.

Since we were making sausage at home, our capacity was limited. We could never make over 200 lbs. on one weekend, and even with just that amount I was creating a mess. A home is not the place to be processing 200 lbs. of meat each week. We went along for a while, and then I took another job. I would now have to travel 130 miles to work each way, or I could live in a dormitory on the job site. I made up my mind quickly, decided my job was a greater priority.

This meant I would have to work every weekend and then

rest in the evening on the job site. In fact, I found even more customers, so the business grew even more. We would make our customers wait up to 6-7 weeks for a delivery of sausage.

Things went along for a while and then I got bored living on the job site. One weekend while I was in town I decided to take the Las Vegas telephone directory to work. I did this because my mother had visited me a couple of years prior and only stayed 2 days. She simply didn't like Las Vegas in that short period of time because she missed her Polish-speaking neighbors. Two days and that was it; I only got to spend 48 hours with her after not seeing her for 6-7 years. When I took her to the airport, I promised her that the next time she visited Las Vegas, the Polish- American Club of Las Vegas would be there to greet her.

I combed through the phone directory and wrote down the names and addresses of people I thought would be Polish. I then arranged to rent a hall on a Saturday night and sent out 400-500 newsletters. It was a very simple letter explaining that I was starting a Polish Club in Las Vegas. On that Saturday more than 200 people showed up. Needless to say, these people wanted a Polish Club.

For the first time in my life I was going to make a public speech, something I never planned. There I was in front of 200 or more people and I thought it would be better to just jump out of the second story window and run away.

However, I was egged on by one of the crowd who kept telling me what a good job I was doing. Alongside this man was a young lady who was also encouraging me. I later learned that this man was Joe Pavlikowski, the city attorney for Las Vegas, and the young lady was his secretary, Elaine Pringle. I didn't realize who these people were because I didn't read the newspapers due to my long absences from home. In either case, my friend Joe Pavlikowski became our first president (he became a district court judge).

We all became friends. We soon leased a hall for our meetings, and had a pot-luck dinner to enhance our good times. The members offered different kind of food and I offered to bring all the smoked sausage.

That did it. After our first meeting, Puckett and I were

swamped with orders (Puckett was an associate member of our club). In fact, a few meetings later, the membership voted to buy the sausage from us and advertise in our monthly newsletter that there would be free Polish sausage sandwiches. At that point we decided that we would stop or get a commercial building. The mess around my home was just too much and we were getting too many orders.

Finally, Puck located a nice building in Las Vegas and we proceeded to work on it. Instead of making sausage, we were building a sausage kitchen on weekends. We had to do it all-build a smokehouse, coolers, plumbing, electrical work, etc. After almost a year of weekends, Puck got disgusted and wanted out. He had already had enough. He never bargained for this much work, and neither had I, for that matter.

As luck would have it, Henry Kutiej (no relation) of the Polish Club found out about this, negotiated an agreement with Puck and quickly bought him out. This was really a stroke of luck because at that time Henry knew more about building than Puck and I together. He was a roofer by trade and had seen and learned many things by being around new construction. On top of this, he was a very hard worker and even drove me on weekends to get the job finished. Without Henry, the Hickory Shop would never have opened.

The Hickory Shop was well on its way to opening. Being of Polish descent, Henry was already familiar with making sausage, so there wasn't much to teach him. During the first few sausage-making sessions, I taught him about curing and smoking.

After many confrontations with the county health department, we were finally allowed to open the doors of The Hickory Shop. I should point out that our confrontations with the health department were largely due to the fact that the Las Vegas area was growing rapidly. Due to this we never had the same official inspect us twice in a row.

New inspectors were always being hired, and it seemed as if we got a new inspector every time. What got approved by one inspector one time would be disapproved by another inspector the next time around. Miles of red tape were created that had to be cut through. There were no real guidelines

that the inspectors had to work with; they just sort of made their own rules as they went along.

On the final day of inspection, a supervisor came in with one of the inspectors to give us an approval to open. Upon entering, the supervisor commented on what a nice job we had done building this sausage kitchen. However, when he got to our walk-in refrigerated cooler, he opened the door and decided that we wouldn't be allowed to open our new sausage kitchen. He wouldn't approve our cooler because the floor was raised and inlaid with square blocks of linoleum. He insisted we should have a metal floor.

We let him finish and then told them both to leave the premises; we would see them both in court. We were just plain sick and tired of the health department's bumbling. We were totally disgusted, because we had invited the health department more than a month earlier and asked them what kind of floor they would want us to install. It was at their request that we installed the linoleum. We had not made an idle threat to sue; we were more than ready to go to court.

Fortunately, the inspector managed to talk us out of suing, and we verbally agreed that when the floor got bad, which was only a few months later, we would replace it. If any of them had had any kind of training they would have told us not to build a floor and just let the cement floor do the job for us. It would be easier to clean and wouldn't rot.

There were many incidents of this nature on our way to opening our little Hickory Shop. One of the funniest incidents that will stay with me the rest of my life is the stainless-steel sink fiasco. When we first purchased this sink we called the health department in to approve it. They immediately said no. Our sink only had two tubs, and we needed a sink with three tubs. He explained that the first sink is filled with soapy water, the second with rinsing water and the third with water and disinfectant. We persuaded the inspector to return to his superior and tell him that we didn't serve the public and had no dishes to disinfect. The inspector returned and approved the sink, which we promptly installed.

Since we were dragging our feet in building our little shop, wouldn't you know it, a new inspector appeared the next

month and told us to remove the sink. He told us he'd reg-tag the entire operation until we got a 3-compartment sink. So help me, my good partner Henry literally took this inspector by the collar and the seat of his pants and bodily threw him out the door.

About 30-40 feet before he reached the street, I started egging Henry on, encouraging him. After the man was thrown out, Hank looked at me, and I looked at him, and we started to laugh. We laughed so hard and so long that we couldn't work any more that day. We were so weak from laughter that we went out and drank about 20 bottles of beer while congratulating ourselves. We were fed up, and just had no intention of putting up with such nonsense. We never saw that inspector again, nor did we ever hear from the health department about this incident. They simply didn't do a thing about it, probably realizing how frustrated we were.

When I think of this incident, I still have to chuckle about it to this day. It was this type of nonsense that led to our confrontation over the cooler when we tried to open our store. We no longer could accept it.

Needless to say, as Las Vegas grew, so did the health department. They became better organized, were allocated more money and printed some guidelines for people to follow. This eliminated a lot of the bumbling and red tape, and they were able to assign a health inspector to each installation for longer periods of time. Over the years we became friends with many of the inspectors as we worked together. I can honestly say, without reservation, that the Clark County Health Department in Las Vegas has developed one of the finest sets of standards for building and inspecting that I have ever seen in the U.S. or anywhere.

We finally got approval to open our little shop and we were on our way. We ordered about 800 pounds of fresh pork butts and were going to use it all to make Polish sausage. It was at this point that we learned even more about how bitter life can sometimes be. We felt that when our doors opened, the customers would be lined up out there, waiting to buy up all our sausage.

Well, it didn't happen. The only people who showed up were some of our personal friends. We tried contacting people by phone and thought it would get around like wildfire. Probably one of the stupidest things we did was opening the shop while making only one kind of sausage. One customer walked in and said, "What? Is this all you have?" I can hear that ringing in my ears to this day.

Opening our store in this manner was like opening a butcher shop and only selling hamburger. We made much more than we could sell. In fact, we threw out at least 400 pounds of meat.

After the first week we quickly realized by the few people who patronized us that it was our job to sell. When a customer comes into the store you have to present him with a variety of products, products not even related to sausage in many cases. We also knew that we had to spend some money advertising in order to let people know we existed.

I guess we had some luck, because more people started to show up. In fact, many of them gave us their recipes for various sausages and asked us to make some for them. We did this gladly as we got more recipes. On top of this, we made 25-pound orders for these people and they bought it all up and distributed the sausage among their own ethnic groups. Now we were moving along and could even afford a little more money for advertising and some long-overdue helpers.

We poked along and were even able to go out and solicit some restaurant business. We got into problems here, however. Before we even got to open our little shop, another sausage kitchen opened, not a half-mile from our shop. They got into the restaurants and gambling casinos very quickly and managed to corner this business. Fortunately for us the other sausage business was only interested in the wholesale end of the business, which had bigger volume.

Luckily for us we were able to poke along and get the retail business. We couldn't compete with them anyway; they had better equipment and a lot more money behind them. The man who opened this business was John Sommers of Burlingame, California. As a professional sausage maker, he

was fully aware that the Las Vegas hotels were using breakfast sausage literally by the ton. These hotels were giving their breakfasts away in those days as an inducement to staying in their hotels. It was not uncommon to buy a complete breakfast for 49¢, 39¢ and 29¢-24 hours a day. Breakfast sausage was literally consumed by the tens of thousands of pounds each week.

At one time, Mr. Sommers was manufacturing 50,000 pounds of breakfast sausage per week. All he made was fresh breakfast or Italian sausages. He simply wasn't set up to sell retail and didn't even want that kind of business. This probably is the biggest reason we were able to get our smoked Polish sausage into some of the restaurants and supermarkets around town.

We started calling on the local bars around town with a creation called a "beer sausage." It was simply our good smoked Polish sausage with a little hot pepper added to the sausage. We were able to purchase some 4-quart steam cookers, which we sold to the bar owners at cost. We always went into a bar with our little cooker and some sausage. We steam-cooked some samples for the owner and the patrons at the bar.

It was like taking candy from a baby. Once they tasted it, we usually left the steam cooker behind and delivered the sausage later. It was such a smashing hit, our production rose to 5,000 lbs. a week. We couldn't have been happier.

However, our happiness was to be short-lived. Our good friend Mr. Sommers, who we never met, decided to sell his sausage business and move on. The new owners decided they wanted all the sausage business in Las Vegas and began competing directly with our little company. They started to cut prices and tried to drive us out, but we had several things in our favor.

First of all, they didn't have the formula for our good "beer sausage" as Mr. Sommers only taught them how to make the products he was selling in Las Vegas. Polish sausage was not one of the varieties they could make.

The last consideration was that they were making an infe-

rior product. We lost a number of customers, but held our ground. We knew we had a good product and could weather the storm. After a brief period, almost all our former customers returned. The beer drinkers knew the difference in the sausages and made it known to the bar owners quickly. They learned you can't get a quality product at cut-rate prices.

It wasn't long after this that we got to meet the former owner, John Sommers. This happened because his relationship with the new owners deteriorated. It was probably for this reason that Mr. Sommers arrived on the scene and introduced himself. We were really happy to meet him because we knew he had to be a nice person-he had simply left us alone and stuck to his own business.

After meeting him and talking with him for a while, he just jumped in with us and started making sausage, helping us along. He taught us more in a few hours than we had learned by ourselves in over two years. He would visit us from time to time, put on an apron and work along with us. He kept teaching us as we went along. He made me aware of the many new suppliers, as well as some bigger and better equipment.

As we developed over the years, about three-quarters of our business was now wholesale. We had grown and had become a formidable sausage-making company in our own right. We grew to the point where the State of Nevada inspected us, as well as the county. It was the State of Nevada now who held power over us, because more than 25% of our business was dependent on wholesale customers. They visited us one day with an official from the United States Department of Agriculture. They advised us that a new law was passed called The Wholesale Meat Act. It was further explained to us that we had to start thinking about remodeling our little sausage kitchen or close up shop.

They gave us a year to make up our minds. Since we were only renting the building, Hank and I felt that we had already improved the building enough. We both decided we would buy our own building so that we could do whatever we wanted. In fact, we needed a lot more room, as we were really cramped. We picked one out that was at that time just outside the-city

limits. We told the realtor we would buy it. The realtor told us the owner was from California and that he would notify him so he could come down and close the deal. To our great surprise, the owner was none other than "The Bavarian Sausage Maker," John Sommers. We were all pleased and quickly negotiated a deal. Not only did Mr. Sommers sell us the building-he even helped draw up the plans for remodeling it.

Probably the best part of this whole deal was the fact that he would lease us about \$15,000 worth of sausage-making equipment. He really wanted us to compete with the other sausage company. Best of all, Mr. Sommers agreed to work with us for a period of time until we were accomplished sausage makers. We were going to go after the big hotels, where the real money was. How could we fail?

The Hickory Shop was closed down so Henry and I could build our 3000-square foot sausage kitchen. This was going to take about another year of hard work, so I finally left my job with the Atomic Energy Commission. I devoted all my time to building this shop. We worked seven days a week and never rested until it was finished. Before we even had our new building approved, we just had to sneak out one or two thousand pounds of our now very famous beer sausage. Even though we were in the very last stages of completing this building, we just couldn't put off our good customers any longer. Our coolers were already operational, so Hank and I decided to bootleg some sausage on a weekend. Our reasoning was that the health departments were all closed and we could get away with it. We ordered 2000 lbs. of meat for a particular weekend and went to work on a Friday evening, waiting until all the health officials were on their way home. It was agreed that Hank would keep up the construction work since he was better at it, and I would make the sausage. We would make the sausage and get rid of it all that weekend. The bars were open seven days a week, 24 hours a day, and our customers would take delivery at any time of the day or night.

Well, we got started and it really felt great to be making sausage again. Since the building departments were also closed for the weekend, Hank decided to do a little illegal plumbing. He rented a gasoline-powered cement cutter so

that he could cut out a certain part of the floor to do some plumbing. I was happily making sausage and Hank was cutting the floor.

I don't remember how long we were working, but I began to feel very weak. A short while later I started getting what I thought was a dizzy spell, and yelled to Hank to come and help me. I got no answer after several calls of help. Somehow I managed to stagger over to where Hank was cutting the cement floor. There he was, sitting on a little box, head resting on the handle. The gasolinepowered cutter was running and Hank had passed out. Instantly I knew we were being poisoned by carbon monoxide. I'll probably never know how I did it or where the strength came from, but I started to drag Hank out of the building. I managed to get to the doors which were opened, and about that time either Hank's wife or son drove up to the building. Whoever it was saw me struggling and helped get Hank out the rest of the way. We both got out and, lucky for us, the fire station was about 100 yards from our building.

Whoever it was quickly brought over the fire department and some oxygen. It just wasn't our time to go, and it became the best-kept secret in Las Vegas. For some reason or other we never spoke of it; the incident ended that night. I guess we both felt a little stupid, even though we had all the doors open to let the carbon monoxide out.

Shortly thereafter, "The Hickory Sausage Company" opened for business. We prepared ourselves a little differently this time; we went out and got some firm orders for sausage before buying any meat at all. We learned our lessons well when opening our first sausage kitchen and, besides, we now had a giant freezer. We could freeze leftover meat or sausage, rather than throw it out.

We went after the big hotels and casinos as well as the hospitals, schools and other institutions. To our dismay, we soon discovered that all of these people took 90 days to pay a bill. To explain this a little further, we would deliver 100 pounds of sausage weekly for 12 weeks before we finally got paid for the first week's delivery. The following week we were

paid for what was delivered 11 weeks ago. In other words, they would tie up a company's money for 12 weeks as long as they chose to do business with them. Many of the hotels were willing to pay their bills a little ahead of schedule if you gave them a substantial discount. They not only tried to take your money away from you at the gambling tables, but tried to take it away from the local vendors as well.

The real problem that these late payments created was the fact that the large meat packers, like Swift or Morrell, had their own terms that we had to obey rigidly. All meat bills must be paid within seven days from the date of delivery of the meat-or you would not receive your next shipment of meat. In effect, we subsidized these customers if we chose to take on their business. We discussed it a little and decided to go after it. We concluded that we could go slowly and just take no more of this business than we could afford.

In either case, we felt everything would work out for us, but it just wasn't to be. We encountered more problems.

First of all, the hotels were only interested in the price of our products and positively not the quality. They could care less about the quality. I was stunned whenever the hospitals gave us the same treatment; I just couldn't believe it. The biggest problem this created for us was the fact that Hank and I never did learn how to make junk sausage.

However, as we were going along, Mr. Sommers even explained that aspect of it to us. Our competition was using pork jowls to make their sausage and we were using pork butts; we just couldn't compete. Our only defense was to be able to get a chef to cook our product alongside the competition's. There was never any competition-we always won. The others just shrank away while ours showed a minimum of shrinkage.

The executive chef really had the last word. If you could get him to complain to the buyer about a certain product, there was some chance of getting in. Unfortunately, the chefs were very hard to get to and you had to get past the purchasing agents or buyers to see him. If you weren't prepared to pay off a purchasing agent or two, it was a waste of time to

even talk to some of the people. In fact, we made a survey and actually found out beforehand what purchasing agent or chef had to be paid off. We simply avoided these people and never did call on them.

The other problem we created for ourselves was the simple fact that we overbuilt our new sausage kitchen and had a hard time paying the bills just to keep it open. We didn't bother to save money for advertising as we used it all up to build. We felt the hotel business didn't require advertising.

To further compound our problems, the Meat Cutters' Union in Las Vegas got into our little act. Just before opening our shop, they simply told us that we could sell a lot of sausage in the hotels as all the kitchen help, chefs, etc. were unionized. They told us in plain English that we wouldn't be able to sell a pound of sausage to a hotel until we joined their union. They did indicate if we joined their union they would help us get into the hotels as well.

Well, we discussed this a little and decided we even had to compete there, since our competitors were also unionized. Hank and I joined and started paying our dues each month. On top of this, our company had to pay an equal amount each month, and we had to go into our savings to do this. To make matters even worse, we were not allowed to hire part-time help when we started to grow. The union said that was taking away a full-time job from one of their members.

In the meantime, Hank and I had to kill ourselves because we only had enough money for part-time help and just couldn't afford the high union wages. It became clearer and clearer now that the Meat Cutters' Union lied to us. They never did help us get any business as they promised and did nothing to help. They were just there to bleed us of our money, money that we took out of our savings. Needless to say, my feelings for unions today are somewhat less than charitable.

The crushing blow came to us when John Sommers was driving in from California after visiting with his family. On the way in he was involved in a serious traffic accident. We not only lost our master sausage maker, but our star salesman. We were already accomplished sausage makers at this time,

but it was through him that we were making inroads into some of the hotels and casinos. We tried to hang on a while, but it was no use; our bills exceeded our profits each week.

We kept going deeper into debt. Hank and I practically cried after all our hard work, but it was very clear. We had to close or sell so we wouldn't lose all our money. We finally agreed to sell, but had to be very careful how we did it. We had thousands and thousands of dollars out there on the books, including some bad-paying hotels. If they found out your company was in trouble, it would be impossible to recoup your money. Taking all these companies to court is not only time-consuming but impractical. We would be spending all our time in court, getting enough money to pay for legal fees.

We needed the money right now, and that's all there was to it. There just had to be a way to do this. The first thing we had to do was stop the incoming shipments of meat. We had to have the confidence of my very good friend, Stuart Wilson, who sold us our meat while representing the Morrell Company in Las Vegas. A salesman of this type easily recognizes the situation when he calls on you each week, especially if you stop buying meat and you haven't placed an order with anyone else. This would get around like wildfire.

Well, we called Stuart in and gave him the bad news; he felt as badly as we did. At this time he was no longer just a salesman; he had been our personal friend for some years. He agreed to help in any way possible. My plans were simple. Hank stayed in the shop, answering the phone and taking care of the few orders that came in. My job was simply to get out there and collect all our money.

My first stop was Sunrise Hospital, and I went directly to their accounting department. I asked to see the head accountant and then told him who I was and presented three months in bills. He proceeded to tell me it was their custom to pay meat bills in 90 days. I simply told him that I wanted all my money right now. I further explained that I didn't want any of their business, either. I made him understand that I wasn't going to leave without my money and he'd better pay me right now.

It worked! I walked out smiling to myself and for the first

time in months, I really felt good. I then went on to all the rest of the people who owed us money and came back with every nickel due us.

We closed "The Hickory Shop," shutting down the machinery. It was like burying your best friend. How could we not feel badly? Hank couldn't stand it and I told him not to bother coming back. He immediately returned to his old roofing job. It was all over now; all the bills were paid and we needed to find a buyer for our building. This proved to be easy, as many companies were about to be closed down for failing to comply with the Wholesome Meat Act. Most of them were on extensions, so my first phone call to a chicken-cutting company gave an immediate buyer. It was all over within about a month.

Regarding the equipment, we returned the leased machinery to John Sommers in Burlingame, California. The rest went to Hank; I simply had had enough and had no intention of being in the sausage business any more. I told Hank he could have it all; he took it home and put it in his garage.

We were lucky enough that all we lost was a year and half of hard work and \$10,000 between us out of a \$50,000 investment. When I got my money I simply laid back in the nice warm sun of Las Vegas. It was mid-May; I didn't do anything for 3-4 months, as I needed the rest very badly. I'm sure that I worked about 3-4 years without a vacation and felt I was entitled to this good time.

After a year or two and frequent inquiries from certain old bars, I decided to take another fling at sausage making. This time I had firm commitments and already knew how much money I was going to make. I even decided to charge a little more money for the product and make it worth my while.

Since Hank wasn't around now, I had to do it all, including the deliveries. I got to meet a lot of people I had only heard of (Hank had done all the deliveries). Among the first people I met was a Julius Bozinski, who had a mail-order business producing identification cards. I delivered some sausage at his business one day and, of course, introduced myself. We hit it off quite well, and I began showing up at his business even when he didn't want sausage.

I was absolutely fascinated by the mail-order business. He was mail-ordering these I.D. cards to every part of the world, not only the U.S.A. and Canada. The stacks of dollar bills his helpers were counting each day just drew me there like a magnet; I couldn't keep away. I was starting to show up so regularly he became concerned that I might want to duplicate his business and compete with him.

I quickly put him at ease and convinced him I wasn't interested in the identification business. I gave him a number of good reasons for this and he took me at my word and accepted my explanations. He was then relieved and we became good friends.

During this period, I found out that he also migrated to Las Vegas from Buffalo, New York. In fact, after discussing it even further, we found out we were from the same neighborhood and even worked at the same golf course as caddies during our younger years. We didn't remember each other, but we had a lot of mutual friends. At this time, Bo took to me even more and started discussing the ways or things I could do to get into the mail-order business.

After quite a few months of dropping in and out of his establishment, Bo finally said, "Why don't you write a book on sausage making; you know a lot about it." He was right; there it was right under my nose. In fact, I had been saving all kinds of recipes and information over the years. The best part of it all was that I had documented it as we were going along. I just figured it was the only thing to do; in case something ever happened to me, Hank could go on without me.

In either case, we both decided I would put together a little booklet of 30 pages or so and call it "Home Meat Curing and Sausage Making." It became a modest success, but at that time I was as foolish as most professional sausage makers-I simply didn't give enough information in that book. I gave some recipes freely and others, later on, were tied into the mail-order business that soon started. I guess because of all my hard work and frustrations, I also went about dispensing this information backwards.

However, there was a definite need for a really good book

on sausage making and meat curing. It would have to be a book with no secrets of any kind, containing detailed explanations.

In my spare time I started to compile the formulas in greater detail. I honestly don't know how many years I was at it. I just kept writing and writing and writing. In fact, it was growing so big I began to doubt if I would ever be able to publish the book. I had hundreds and hundreds of hand-written formulas, which really make a big stack of paper. However, after typing, the original book only came out to be about 167 pages.

From the beginning I never considered getting a publisher for my book; I just never thought about it. Besides, Bo had a printing shop and I could already run some of his printing presses. I don't know how I ever started being a do-it-yourselfer, but I guess that's what I am. In either case, I was doing odd jobs like plumbing and electrical work and the rest of the time was devoted to the mail-order business.

I would continue to write this new book whenever I had time, and even decided that the title of this new book would be "*Great Sausage Recipes and Meat Curing.*"

I was almost finished with my book when some old friends showed up in Las Vegas for a funeral I attended in 1976. Later, we got together and talked over old times as well as the present. I found out my friend was now a junior executive with a company that had some huge contracts in Saudi Arabia as well as all over the world. He offered me a very high-paying job and a 3-year contract. I just couldn't say no. I figured I could finish the rest of the book in Saudi Arabia, as I would have lots and lots of time. Then, after three years, I would have lots and lots of money to publish and advertise the book. After all the negotiating was completed, I was given 90 days to clean up the loose ends.

However, I was doing that anyway, so I decided I would leave for New York, which was acceptable to the company. I had some personal belongings to take to Buffalo and, furthermore, it was 1976. What better time to see the U.S.A. than on its birthday?

I arrived in Buffalo and visited old friends and relatives for about two weeks. I quickly became bored. I decided to continue work on *"Great Sausage Recipes and Meat Curing"* and, to my amazement, was done in about one week. I then proceeded to find out that I could get my book printed in a matter of days and at a fraction of the price it would have cost me in Las Vegas.

Why? Because Buffalo is the printinest town in the U.S.A. Some of the print shops here are the world's finest. Anytime you can find a company that can print 20,000,000 copies of the Readers' Digest each month, it has to have some really good technology.

I immediately had the printer print me 3,000 copies of *"Great Sausage Recipes and Meat Curing,"* and sold them all in 30 days. Needless to say, I was stunned. I knew there was a great demand for a good sausage-making book, but not this great. A business office was set up at 179 Military Rd., which was the barber shop where everyone in the neighborhood, including myself and Ben would get hair cuts. The shop was at best 12 feet x 20 feet. This small store was where I pursued my dream of starting a company that would help the home sausage maker make their own sausage and enjoy it. This building was adequate for about a year.

As the business grew, and part-time help was needed the second move was to a former hardware store at 1067 Grant St. In the early years (BC - before computers) all correspondence was done by typewriter and/or by hand written letters. I was chief cook and bottle washer. It was not unusual for me to put in twelve to fourteen hour days.

The building at 177 Military Rd. became available in 1981 and I feel that this was the turning point in a growing company. This building was large enough to separate the business office from the kitchen and shipping department. It was also at this building that many new items were added to the catalog and inventory. The most notable would be the 5 lb. and 15 lb. stuffers, meat grinders and of course the 20 lb. smoke-houses.

Our first 20 lb. smokehouse was a concentrated effort by

Ben and myself. It took two weeks to build a single wall sheet metal box with an electric heating element, shelves, dowels and a sliding front door prototype smoker. Surprisingly it worked. The production of this smoker helped to establish the manufacturing end and eventually led to the 20 lb. insulated smokehouse.

It was at this time I considered the possibility of manufacturing stainless steel stuffers. An investment was made in machinery, employees and building space and USDA approval was received.

We are proud of our manufacturing division which has grown from the initial 20 lb. smokers to 100 lb. and 50 lb. smokers; smoke generators, steam generators, cabbage shredders, stuffers and currently our all stainless steel grill.

As the company grew, 177 Military could not handle all the business. A search went out for another building not far away. An old school house at 26 Military Rd. became available. This building housed the business office, kitchen, shipping and part of the warehouse. A third building was rented for additional warehouse space.

26 Military Rd. was a temporary fix. Once again it was imperative that a decision had to be made. In 1997 our present building at 1500 Clinton Street was purchased. This was the first time in about 15 years that the entire operation was under one building. The move took place in July of 1997. I had seen the dream come true from a one room store to a 300,000 sq. ft. building.

Editor's Note:

The sad part of this historical background is that Ryttek was only able to enjoy this part of the business for eight months. He passed away suddenly in 1998.

LAYING OUT A SAUSAGE KITCHEN

Laying out a sausage kitchen is important. It really doesn't take much to do the job right and it's better to get it done correctly in the first place. If you have an idea of the type of operation you're going to establish, you will have a much better idea of how big a building you'll want to rent or build. There are many buildings that are not suitable for sausage kitchens. If you are going to set up any size kitchen, the building should be at least 20 feet in width and 20-25 feet in length. Even a square building will allow a more efficient operation. The size of the equipment needed to manufacture sausage properly demands a building this size.

The sketch you see on page 482 will easily allow you to manufacture several thousand pounds of sausage per week. Keep in mind that you'll also be needing another room for an office and possibly a retail area as well. The building will then need additional space for these other operations.

Take special note there is a wall between the kitchen and the smokehouse room. There are some good reasons why this should be incorporated into your plans. From time to time, you'll want to look into the smokehouse during the course of processing. It is better to contain this smoke, with the associated heat, in one room (possibly installing an exhaust fan). Additionally, meat may have to be cooked to make sausage. This would produce heat and steam, which would be better kept away from the actual sausage making operation. It is best to have these heat-producing operations in one room. Whenever possible, the sausage-making room should be kept cool, even air-conditioned if necessary.

You should store spices and other ingredients away from the sausage kitchen area as it is a high-humidity area. Spices should be stored in a dry area, then brought into the kitchen when you're ready to start making sausage.

When setting up a sausage kitchen, it is best to follow this layout.

Figure 1

The meat is brought into the building for storage. We begin by taking the meat out of the cooler for boning.

Figure 2

A sink is required nearby for a number of reasons. From time to time a piece of meat will fall on the floor during boning. If a sink is close by you can get to it quickly and rinse the meat. It is also handy to have a sink nearby to flush casings and wash utensils. Additionally, you can wash down the whole kitchen with a mixture of hot and cold water using the sink with a hose.

Figures 3 and 4

A boning table serves two purposes in a small operation. It is a place to bone the meat and pile it up until it's ready to be further cut up. It is also a good place to mount a meat grinder.

Figures 5 and 7

The meat mixer is always placed under the meat grinder and the product is then transferred to the sausage stuffer.

Figure 6

After the meat is ground and mixed, the foot pedal sink is handy to have nearby because you'll need to wash your hands after filling the stuffer (you can wash up in the large, two-compartment sink if you want to save money).

Figures 7A and 8

A sausage stuffing table is almost a must in any size operation. It is a great table because they are all made with the edge curled up about 1 inch. This prevents sausage from falling on the floor. You can easily store 25-50 lbs. of sausage on the table if you are a one-man operation. In other words, you can stuff all the sausage first and then do the linking and hanging on smoke sticks.

Figure 9

You'll want your smokehouse truck or sausage cage close by when you are linking or hanging sausage.

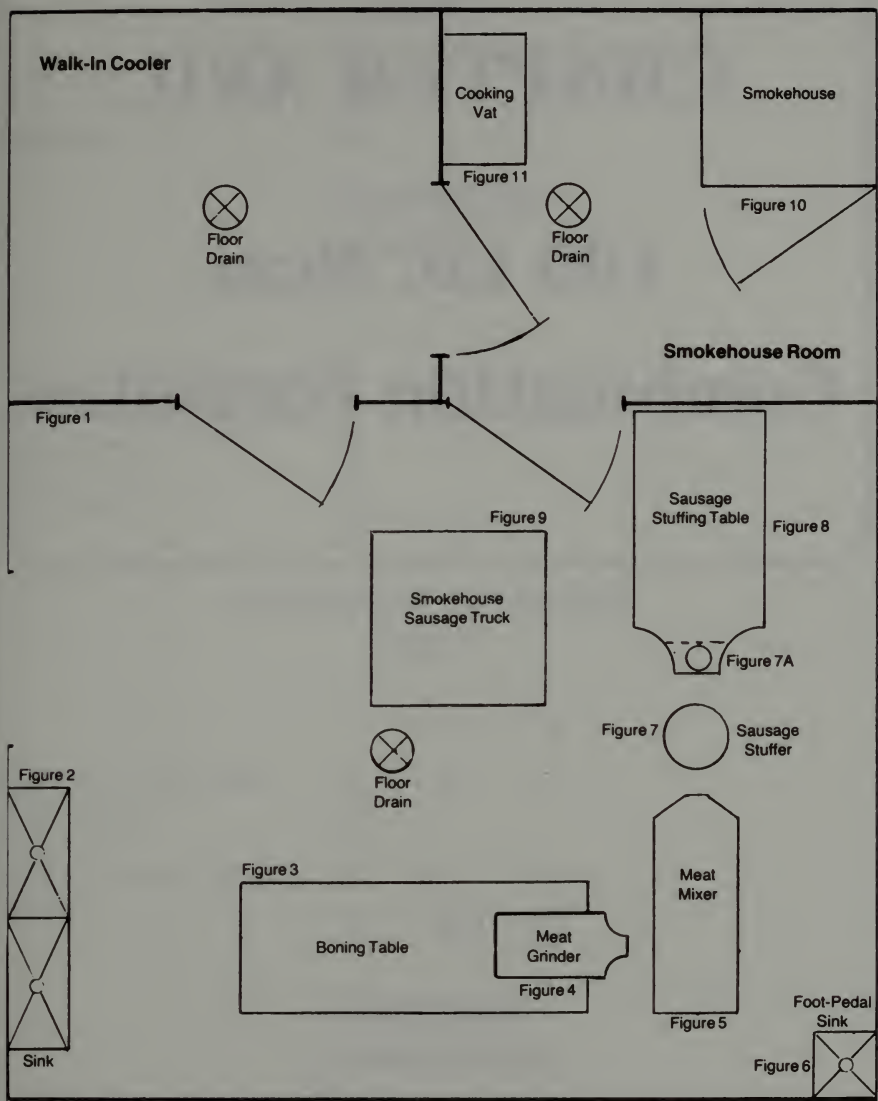
Figure 10

After the sausage is made, the truck is then pushed into the smokehouse and the smoking is begun. After smoking, the sausage is usually cooled with water over a drain installed between the smokehouse and the cooler.

If it is at all possible, you should incorporate a floor drain in the sausage kitchen so you can hose down the entire area and send it down the drain. This beats mopping. Of course, the floor drain would also be great in the smokehouse room, not only to cool the sausage but also to wash out the smokehouse from time to time. Last but not least, washing a cooler is much easier if you have a floor drain installed.

One bit of advice: if you are going to install a floor drain, be sure they are large drains and the sewer pipe is 4 inches in diameter.

Schematic Drawing of a Well-Organized Sausage Kitchen



CHAPTER XVII

100 Lb. Meat

Combination Formulas

FARMER-STYLE LIVER SAUSAGE MEAT

	lb.
Pork livers	35
Pork snouts	35
Beef tripe	30

THURINGER MEAT

	1	2
Extra lean pork trimmings	40	80
or skinned fattened shoulders		
Pork cheeks	20	20
Pork hearts	20	
Pork fat 9.0	<u>20</u>	<u> </u>
	100	100

CERVELAT SAUSAGE MEAT

	1	2	3
Lean bull or cow meat	35	80	75
Beef cheeks	20		
Beef hearts	20		
Regular pork trimmings	25		25
Pork fat	<u> </u>	<u>9.0</u>	<u> </u>
	100	100	100

LINGUISA (LONGANIZA)

100 lbs. frozen certified pork butts

KOSHER STYLE SALAMI MEAT

	1	2
Cow meats	60	40
Beef plates	40	40
Beef cheeks	—	<u>20</u>
	100	100

SMOKED POLISH SAUSAGE (KIELBASA) MEAT

100 lbs. boneless pork buns

KRAKOWSKI MEAT

100 lbs. boneless fresh hams

BOCKWURST MEAT

	1	2
Boneless veal	30	50
Lean pork shoulder trimmings	50	
Pork back fat	20	
Regular pork trimmings	—	<u>50</u>
	100	100

BRATWURST MEAT

20 lbs. boneless veal
50 lbs. fresh pork shoulders
30 lbs. lean pork trimmings

KNOCKWURST MEAT

	1	2
Boneless veal	70	
Regular pork trimmings	30	
Bull or cow meat		70
Pork back fat	—	<u>30</u>
	100	100

COOKED SALAMI MEAT

	1	2	3	4	5
Very lean bull or cow trimmings	65	40	30	50	50
Very lean pork trimmings					40
Regular pork trimmings	35	20		50	10
Pork cheeks		20	20		
Beef cheeks		20	30		
Pork fat	—	—	<u>9.0</u>	—	—
	100	100	100	100	100

BRAUNSCHWEIGER LIVER SAUSAGE MEAT

	1	2
Pork livers	55	50
Pork jowls	<u>45</u>	<u>50</u>
	100	100

LIVERWURST MEAT

35 lbs. pork livers
35 lbs. pork snouts
30 lbs. beef tripe

MORTADELLA MEAT

95 lbs. lean pork
5 lbs. backfat or jowls

CHINESE STYLE SAUSAGE MEAT

65 lbs. very lean pork
35 lbs. back fat

SMOKED PORK SAUSAGE (BREAKFAST) MEAT

	1	2
Regular pork trimmings	40	50
Special lean pork trimmings	60	20
Pork cheeks	—	<u>30</u>
	100	100

BLOOD & TONGUE SAUSAGE MEAT

30 lbs. pork tongues
30 lbs. pork snouts
15 lbs. pork skins
15 lbs. beef blood
10 lbs. pork fat

BLOOD SAUSAGE (KISZKA) MEAT

50 lbs. pork snouts
20 lbs. pork tongues
10 lbs. pork skins
20 lbs. buckwheat groats or barley

**FRESH PORK SAUSAGE
(BREAKFAST)
MEAT**

	1	2
Lean pork buffs	50	
Lean pork trimmings		50
Regular pork trimmings	<u>50</u> 100	<u>50</u> 100

**FRESH POLISH SAUSAGE
(KIELBASA)
MEAT**

100 lbs. boneless pork butts

**FRESH ITALIAN SAUSAGE-MILD HOT
MEAT**

100 lbs. boneless pork butts

**KOSHER STYLE BEEF SAUSAGE-FRESH
MEAT**

35 lbs. beef plates
35 lbs. beef flanks
30 lbs. beef navels

**LEBERKASE
MEAT**

35 lbs. boneless beef, cow or bullmeat
35 lbs. regular pork trimmings
28 lbs. lean shoulder or pork butts
2 lbs. pork liver

HEAD CHEESE MEAT

50 lbs. cured pork tongues

40 lbs. pork snouts cured

10 lbs. pork skins

Cure tongues for 3 to 5 days in a brine made with:

10 gal. water

10 lbs. salt

3 lbs. cane sugar

1 lb. of cure

CHORIZO MEAT

100 lbs. boneless pork buns

SOUSE MEAT

50 lbs. cured pork tongues

40 lbs. pork snouts cured

10 lbs. pork skins

Cure tongues 3 to 5 days in a brine made with:

10 gal. water

10 lbs. salt

3 lbs. cane sugar

1 lb. of cure

OLD FASHION LOAF MEAT

75 lbs. pork butts

25 lbs. beef plates

CAPICOLA MEAT

Lean boneless pork butts

PEPPERONI STICKS MEAT

	1	2	3
Boneless cowmeat	50	40	
Lean pork butts			50
Beef cheeks	20	40	
Regular pork trimmings			10
Beef flanks or plates	30	20	
Boneless beef	<u> </u>	<u> </u>	<u>40</u>
	100	100	100

HARD SALAMI MEAT

25 lbs. lean boneless beef
65 lbs. lean pork trimmings
10 lbs. backfat

DRIED FARMERS SAUSAGE MEAT

80 lbs. lean boneless beef
15 lbs. lean pork trimmings
5 lbs. backfat

GENOA SALAMI MEAT

lbs. very lean pork trimmings
or boneless beef
15 lbs. backfat

GAME SAUSAGES

SMOKED VENSION POLISH SAUSAGE MEAT

80 lbs. lean elk or venison
20 lbs. regular pork trimmings

VENISON THURINGER MEAT

70 lbs. lean elk or venison
30 lbs. fat beef trimmings

SMOKED VENISON BREAKFAST SAUSAGE MEAT

80 lbs. lean elk or venison
20 lbs. pork or beef fat

VENISON SALAMI MEAT

80 lbs. lean elk or venison
20 lbs. (preferably back fat)

SMOKED VENISON SUMMER SAUSAGE MEAT

80 lbs. lean elk meat or venison
20 lbs. regular pork trimmings

GOTEBORG SUMMER SAUSAGE MEAT

	1	2	3
Bull or cow trimmings	35	80	75
Beef cheeks trimmed	20		
Beef hearts	20		
Regular pork trimmings	25		25
Pork fat		20	
	100	100	100

METTWURST

MEAT

	1	2	3
Regular pork trimmings	50		20
Boneless veal	50	20	
Bull meat		50	20
Pork back fat		30	
Boneless Boston butts	—	—	<u>60</u>
	100	100	100

BRAUNSCHWEIGER

MEAT

	1	2
Pork livers	55	50
Pork jowls	45	
Regular pork trimmings	—	<u>50</u>
	100	100

PASTRAMI

MEAT

Use a very good grade of beef plates or well trimmed briskets.

WIENERS (FRANKFURTERS) MEAT

Wieners can be made from many different meats, as well as a combination of meats. In some cases many people want to use the left overs when they butcher their livestock and others wish a quality wiener. It is worthy to note that wieners can be made from these various meats:

	1	2	3	4	5	6
Bull or cow trimmings, lean	60	50	30	60	40	70
Regular pork trimmings	40	50			25	10
Beef cheeks			30			
Skinned pork jowls			30			
Pork cheeks trimmed			10	20	15	
Fat pork trimmings				20		
Fat beef trimmings					20	
Pork fat	—	—	—	—	—	<u>20</u>

LARGE, LONG AND RING BOLOGNA MEAT

	1	2	3	4	5	6	7	8	9
Bull or cow trimmings	60	50	30	60	40	70	55	60	60
Reg. pork trimmings	40	50			25				
Beef cheeks (trimmed)			30						
Pork cheeks (trimmed)			10	20	15				
Fat pork trimmings				20			25		
Fat beef trimmings					20	30			
Lean pork trimmings							20		
Beef hearts								20	
Pork snouts								20	20
Pork hearts	—	—	30	—	—	—	—	—	20
	100	100	100	100	100	100	100	100	100

CHAPTER XVIII

Canning

Canning is another common way of preserving fruits, vegetables and meats. The following information will be extremely useful to any person interested in canning. The article is courtesy of Cornell Cooperative Extension and US Department of Agriculture.

Why can foods?

Canning can be a safe and economical way to preserve quality food at home. Disregarding the value of your labor, canning homegrown food may save you half the cost of buying commercially canned food. Canning favorite and special products to be enjoyed by family and friends is a fulfilling experience and a source of pride for many people.

Many vegetables begin losing some of their vitamins when harvested. Nearly half the vitamins may be lost within a few days unless the fresh produce is cooled or preserved. Within 1 to 2 weeks, even refrigerated produce loses half or more of some of its vitamins. The heating process during canning destroys from one-third to one-half of vitamins A and C, thiamin, and riboflavin. Once canned, additional losses of these sensitive vitamins are from 5 to 20 percent each year. The amounts of other vitamins, however, are only slightly lower in canned compared with fresh food. If vegetables are handled properly and canned promptly after harvest, they can be more nutritious than fresh produce sold in local stores.

The advantages of home canning are lost when you start with poor quality fresh foods; when jars fail to seal properly; when food spoils; and when flavors, texture, color, and nutrients deteriorate during prolonged storage.

The information and guides that follow explain many of these problems and recommend ways to minimize them.

How canning preserves foods

The high percentage of water in most fresh foods makes them very perishable. They spoil or lose their quality for several reasons:

- growth of undesirable microorganisms-bacteria, molds, and
- yeasts, activity of food enzymes,
- reactions with oxygen,
- moisture loss.

Microorganisms live and multiply quickly on the surfaces of fresh food and on the inside of bruised, insect-damaged, and diseased food. Oxygen and enzymes are present throughout fresh food tissues.

Proper canning practices include:

- carefully selecting and washing fresh food,
- peeling some fresh foods,
- hot packing many foods,
- adding acids (lemon juice or vinegar) to some foods,
- using acceptable jars and self-sealing lids,
- processing jars in a boiling-water or pressure canner for the correct period of time.

Collectively, these practices remove oxygen; destroy enzymes; prevent the growth of undesirable bacteria, yeasts, and molds; and help form a high vacuum in jars. Good vacuums form tight seals which keep liquid in and air and microorganisms out.

Ensuring safe canned foods

Growth of the bacterium *Clostridium botulinum* in canned food may cause botulism—a deadly form of food poisoning. These bacteria exist either as spores or as vegetative cells. The spores, which are comparable to plant seeds, can survive harmlessly in soil and water for many years. When ideal conditions exist for growth, the spores produce vegetative cells which multiply rapidly and may produce a deadly toxin within 3 to 4 days of growth in an environment consisting of:

- a moist, low-acid food
- a temperature between 40° and 120°F
- less than 2 percent oxygen

Botulinum spores are on most fresh food surfaces. Because they grow only in the absence of air, they are harmless on fresh foods.

Most bacteria, yeasts, and molds are difficult to remove from food surfaces. Washing fresh food reduces their numbers only slightly. Peeling root crops, underground stem crops and tomatoes reduces their numbers greatly. Blanching also helps, but the vital controls are the method of canning and making sure the recommended research-based process times, found in these guides, are used.

The processing times in these guides ensure destruction of the largest expected number of heat-resistant microorganisms in home-canned foods. Properly sterilized canned food will be free of spoilage if lids seal and jars are stored below 95°F. Storing jars at 50° to 70°F enhances retention of quality.

Food acidity and processing methods

Whether food should be processed in a pressure canner or boiling-water canner to control botulinum bacteria depends on the acidity in the food. Acidity may be natural, as in most fruits, or added, as in pickled food. *Low-acid* canned foods contain too little acidity to prevent the growth of these bacteria. *Acid* foods contain enough acidity to block their growth, or destroy them more rapidly when heated. The term "pH" is a measure of acidity; the lower its value, the more acid the food. The acidity level in foods can be increased by adding lemon juice, citric acid, or vinegar.

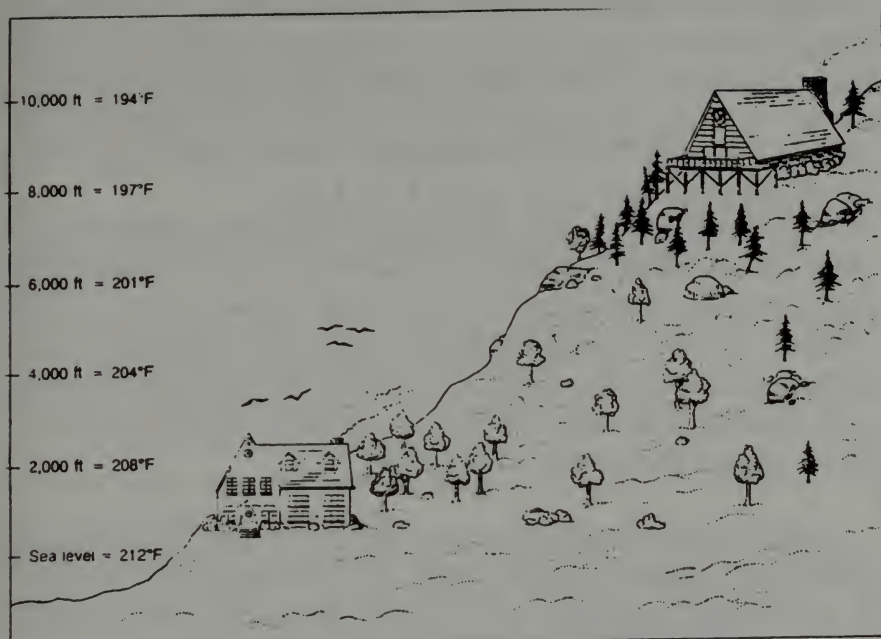
Low-acid foods have pH values higher than 4.6. They include red meats, seafood, poultry, milk, and all fresh vegetables except for most tomatoes. Most mixtures of low-acid and acid foods also have pH values above 4.6 unless their recipes include enough lemon juice, citric acid, or vinegar to make them acid foods. Acid foods have a pH of 4.6 or lower. They include fruits, pickles, sauerkraut, jams, jellies, marmalades, and fruit butters.

Although tomatoes usually are considered an acid food, some are now known to have pH values slightly above 4.6. Figs also have pH values slightly above 4.6.

Therefore, if they are to be canned as acid foods, these products must be acidified to a pH of 4.6 or lower with lemon juice or citric acid. Properly acidified tomatoes and figs are acid foods and can be safely processed in a boiling-water canner.

Botulinum spores are very hard to destroy at boiling-water temperatures; the higher the canner temperature, the more easily they are destroyed. Therefore, all low-acid foods should be sterilized at temperatures of 240° to 250°F attainable with pressure canners operated at 10 to 15 PSIG. PSIG means pounds per square inch of pressure as measured by gauge. The more familiar "PSI" designation is used hereafter in this publication. At temperatures of 240° to 250°F the time needed to destroy bacteria in low-acid canned food ranges from 20 to 100 minutes. The exact time depends on the kind of food

being canned, the way it is packed into jars, and the size of jars. The time needed to safely process low-acid foods in a boiling-water canner ranges from 7 to 11 hours; the time needed to process acid foods in boiling water varies from 5 to 85 minutes.



Process adjustments at high altitudes

Using the process time for canning food at sea level may result in spoilage if you live at altitudes of 1,000 feet or more. Water boils at lower temperatures as altitude increases. Lower boiling temperatures are less effective for killing bacteria. Increasing the process time or canner pressure compensates for lower boiling temperatures. Therefore, when you use the guides, select the proper processing time or canner pressure for the altitude where you live. If you do not know the altitude, contact your local county Extension agent. An alternative source of information would be the local district conservationist with the Soil Conservation Service.

Ensuring high-quality canned foods

Begin with good-quality fresh foods suitable for canning. Quality varies among varieties of fruits and vegetables. Many county Extension offices can recommend varieties best suited for canning. Examine food carefully for freshness and wholesomeness. Discard diseased and moldy food. Trim small diseased lesions or spots from food.

Can fruits and vegetables picked from your garden or purchased from nearby producers when the products are at their peak of quality-within 6 to 12 hours after harvest for most vegetables. For best quality, apricots, nectarines, peaches, pears, and plums should be ripened 1 or more days between harvest and canning. If you must delay the canning of other fresh produce, keep it in a shady, cool place.

Fresh home-slaughtered red meats and poultry should be chilled and canned without delay. Do not can meat from sickly or diseased animals. Ice fish and seafoods after harvest, eviscerate immediately, and can them within 2 days.

Maintaining color and flavor in canned food

To maintain good natural color and flavor in stored canned food, you must:

- Remove oxygen from food tissues and jars,
- Quickly destroy the food enzymes,
- Obtain high jar vacuums and airtight jar seals.

Follow these guidelines to ensure that your canned foods retain optimum colors and flavors during processing and storage:

- Use only high-quality foods which are at the proper maturity and are free of diseases and bruises.
- Use the hot-pack method, especially with acid foods to be processed in boiling water.
- Don't unnecessarily expose prepared foods to air. Can them as soon as possible.
- While preparing a canner load of jars, keep peeled, halved, quartered, sliced, or diced apples, apricots, nectarines, peaches, and pears in a solution of 3 grams (3,000 milligrams) ascorbic acid to 1 gallon of cold water.

This procedure is also useful in maintaining the natural color of mushrooms and potatoes, and for preventing stem-end discoloration in cherries and grapes. You can get ascorbic acid in several forms:

Pure powdered form - seasonally available among canners' supplies in supermarkets. One level teaspoon of pure powder weighs about 3 grams. Use 1 teaspoon per gallon of water as a treatment solution.

Vitamin C tablets - economical and available year-round in many stores. Buy 500 - milligram tablets; crush and dissolve six tablets per gallon of water as a treatment solution.

Commercially prepared mixes of ascorbic and citric acid - seasonally available among canners' supplies in supermarkets. Sometimes citric acid powder is sold in supermarkets, but it is less effective in controlling discoloration. If you choose to use these products, follow the manufacturer's directions.

- Fill hot foods into jars and adjust headspace as specified in recipes.
- Tighten screw bands securely, but if you are especially strong, not as tightly as possible.
- Process and cool jars.
- Store the jars in a relatively cool, dark place, preferably between 50° and 70°F
- Can no more food than you will use within a year.

Advantages of hot-packing

Many fresh foods contain from 10 percent to more than 30 percent air. How long canned food retains high quality depends on how much air is removed from food before jars are sealed.



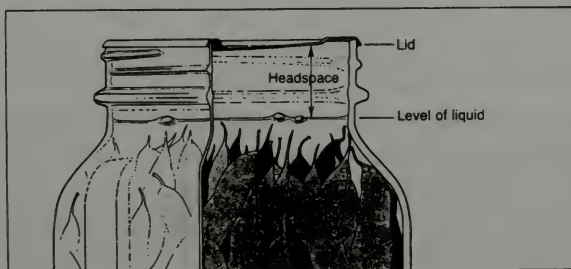
Raw-packing is the practice of filling jars tightly with freshly prepared, but unheated food. Such foods, especially fruit, will float in the jars. The entrapped air in and around the food may cause discoloration within 2 to 3 months of storage. Raw-packing is more suitable for vegetables processed in a pressure canner.

Hot-packing is the practice of heating freshly prepared food to boiling, simmering it 2 to 5 minutes, and promptly filling jars loosely with the boiled food. Whether food has been hot-packed or raw-packed, the juice, syrup, or water to be added to the foods should also be heated to boiling before adding it to the jars. This practice helps to remove air from food tissues, shrinks food, helps keep the food from floating in the jars, increases vacuum in sealed jars, and improves shelf life. Preshrinking food permits filling more food into each jar.

Hot-packing is the best way to remove air and is the preferred pack style for foods processed in a boiling-water canner. At first, the color of hot-packed foods may appear no better than that of raw-packed foods, but within a short storage period, both color and flavor of hot-packed foods will be superior.

Controlling headspace

The unfilled space above the food in a jar and below its lid is termed headspace. Directions for canning specify leaving 1/4-inch for jams and jellies, 1/2-inch for fruits and tomatoes to be processed in boiling water, and from 1- to 1-1/4-inches in low-acid foods to be processed in a pressure canner. This space is needed for expansion of food as jars are processed, and for forming vacuums in cooled jars. The extent of expansion is determined by the air content in the food and by the processing temperature. Air expands greatly when heated to high temperatures; the higher the temperature the greater the expansion. Foods expand less than air when heated.



Jars and lids

Food may be canned in glass jars or metal containers. Metal containers can be used only once. They require special sealing equipment and are much more costly than jars.

Regular and wide-mouth Mason-type, threaded, home-canning jars with self-sealing lids are the best choice. They are available in 1/2 pint, pint, 1-1/2 pint, quart, and 1/2 gallon sizes. The standard jar mouth opening is about 2-3/8 inches. Wide-mouth jars have openings of about 3 inches, making them more easily filled and emptied. Half-gallon jars may be used for canning very acid juices. Regular-mouth decorator jelly jars are available in 8 and 12 ounce sizes. With careful use and handling, Mason jars may be reused many times, requiring only new lids each time. When jars and lids are used properly, jar seals and vacuums are excellent and jar breakage is rare.



Most commercial pint-and quart-size mayonnaise or salad dressing jars may be used with new two-piece lids for canning acid foods. However, you should expect more seal failures and jar breakage. These jars have a narrower sealing surface and are tempered less than Mason jars, and may be weakened by repeated contact with metal spoons or knives used in dispensing mayonnaise or salad dressing. Seemingly insignificant scratches in glass may cause cracking and breakage while processing jars in a canner. Mayonnaise-type jars are not recommended for use with foods to be processed

in a pressure canner because of excessive jar breakage. Other commercial jars with mouths that cannot be sealed with two-piece canning lids are not recommended for use in canning any food at home.

Jar cleaning

Before every use, wash empty jars in hot water with detergent and rinse well by hand, or wash in a dishwasher. Unrinsed detergents may cause unnatural flavors and colors. These washing methods do not sterilize jars. Scale or hard-water films on jars are easily removed by soaking jars several hours in a solution containing 1 cup of vinegar (5 percent acidity) per gallon of water.

Sterilization of empty jars

All jams, jellies, and pickled products processed less than 10 minutes should be filled into sterile empty jars. To sterilize empty jars, put them right side up on the rack in a boiling-water canner. Fill the canner and jars with hot (not boiling) water to 1 inch above the tops of the jars. Boil 10 minutes at altitudes of less than 1,000 ft. At higher elevations, boil 1 additional minute for each additional 1,000 ft elevation. Remove and drain hot sterilized jars one at a time. Save the hot water for processing filled jars. Fill jars with food, add lids, and tighten screw bands.

Empty jars used for vegetables, meats, and fruits to be processed in a pressure canner need not be presterilized. It is also unnecessary to presterilize jars for fruits, tomatoes, and pickled or fermented foods that will be processed 10 minutes or longer in a boiling-water canner.

Lid selection, preparation, and use

The common self-sealing lid consists of a flat metal lid held in place by a metal screw band during processing. The flat lid is crimped around its bottom edge to form a trough, which is filled with a colored gasket compound. When jars are

processed, the lid gasket softens and flows slightly to cover the jar-sealing surface, yet allows air to escape from the jar. The gasket then forms an airtight seal as the jar cools. Gaskets in unused lids work well for at least 5 years from date of manufacture. The gasket compound in older unused lids may fail to seal on jars.

Buy only the quantity of lids you will use in a year. To ensure a good seal, carefully follow the manufacturer's directions in preparing lids for use. Examine all metal lids carefully. Do not use old, dented, or deformed lids, or lids with gaps or other defects in the sealing gasket.



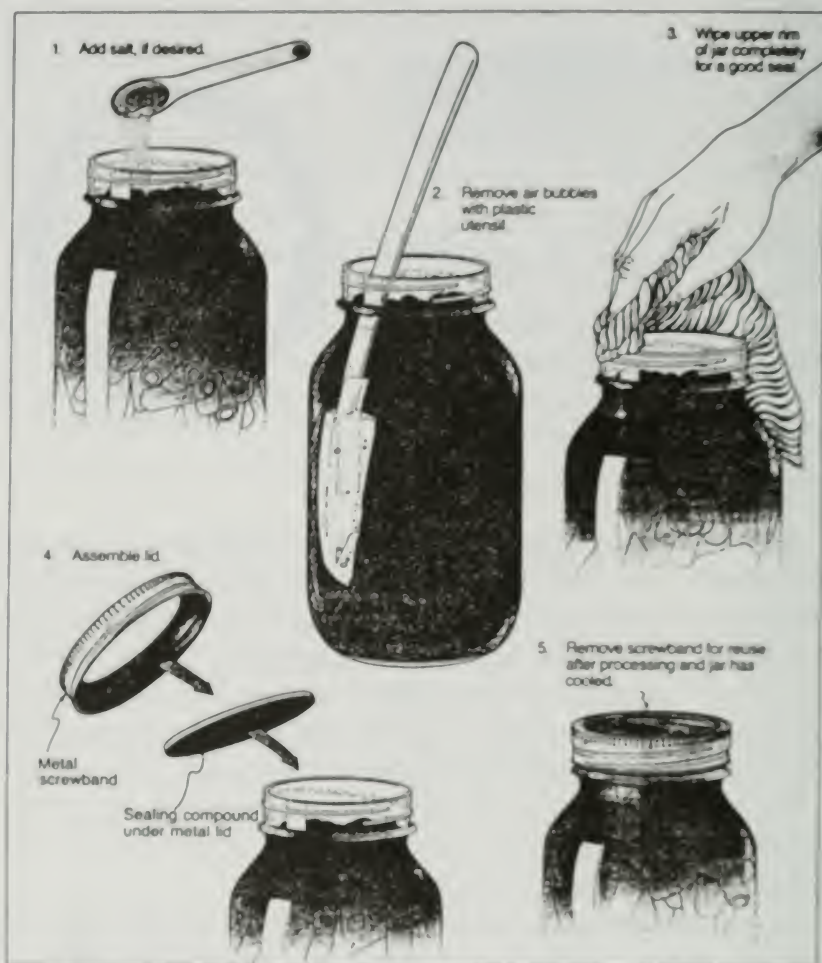
After filling jars with food, release air bubbles by inserting a flat plastic (not metal) spatula between the food and the jar. Slowly turn the jar and move the spatula up and down to allow air bubbles to escape. Adjust the headspace and then clean the jar rim (sealing surface) with a dampened paper towel. Place the lid, gasket down, onto the cleaned jar-sealing surface. Uncleaned jar-sealing surfaces may cause seal failures.

Then fit the metal screw band over the flat lid. Follow the manufacturer's guidelines enclosed with or on the box for tightening the jar lids properly.

Do not retighten lids after processing jars. As jars cool, the contents in the jar contract, pulling the self-sealing lid firmly against the jar to form a high vacuum.

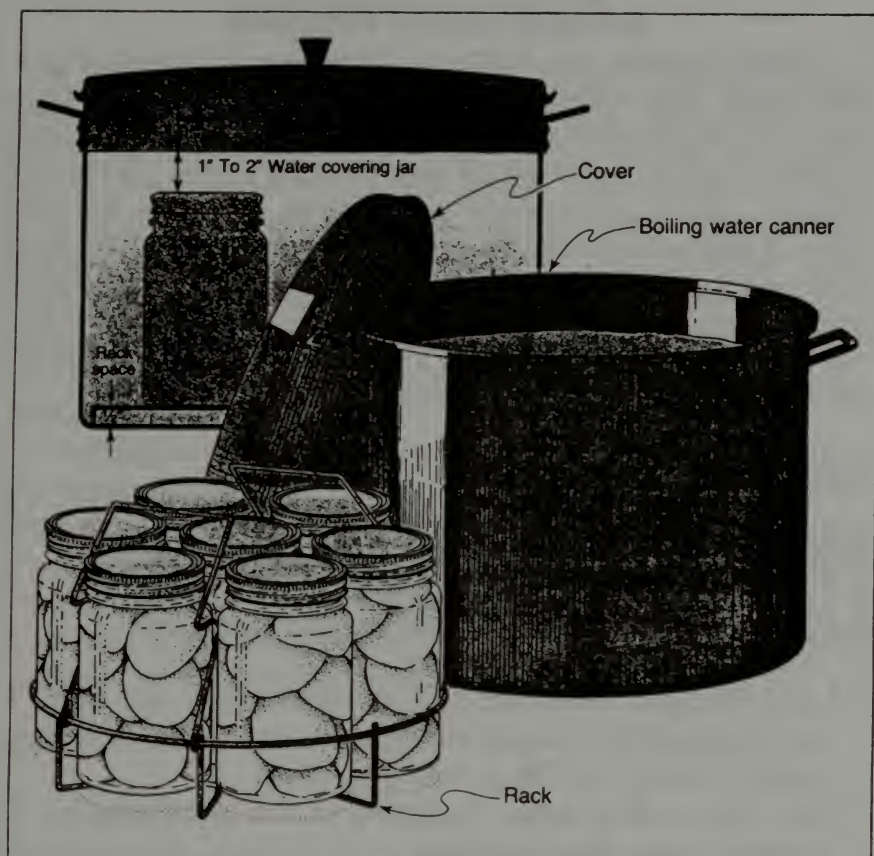
- If rings are too loose, liquid may escape from jars during processing, and seals may fail.
- If rings are too tight, air cannot vent during processing, and food will discolor during storage. Overtightening also may cause lids to buckle and jars to break, especially with raw-packed, pressure-processed food.

Screw bands are not needed on stored jars. They can be removed easily after jars are cooled. When removed, washed, dried, and stored in a dry area, screw bands may be used many times. If left on stored jars, they become difficult to remove, often rust, and may not work properly again.



Recommended canners

Equipment for heat-processing home-canned food is of two main types-boiling water canners and pressure canners. Most are designed to hold seven quart jars or eight to nine pints. Small pressure canners hold four quart jars; some large pressure canners hold 18 pint jars in two layers, but hold only seven quart jars. Pressure saucepans with smaller volume capacities are not recommended for use in canning. Small capacity pressure canners are treated in a similar manner as standard larger canners, and should be vented using the typical venting procedures.



Low-acid foods must be processed in a pressure canner to be free of botulism risks. Although pressure canners may also be used for processing acid foods, boiling water canners are recommended for this purpose because they are faster. A pressure canner would require from 55 to 100 minutes to process a load of jars; while the total time for processing most acid foods in boiling water varies from 25 to 60 minutes. A boiling-water canner loaded with filled jars requires about 20 to 30 minutes of heating before its water begins to boil. A loaded pressure canner requires about 12 to 15 minutes of heating before it begins to vent; another 10 minutes to vent the canner, another 5 minutes to pressurize the canner; another 8 to 10 minutes to process the acid food; and, finally, another 20 to 60 minutes to cool the canner before removing jars.

Boiling-water canners

These canners are made of aluminum or porcelain-covered steel. They have removable perforated racks and fitted lids. The canner must be deep enough so that at least 1 inch of briskly boiling water will be over the tops of jars during processing. Some boiling-water canners do not have flat bottoms. A flat bottom must be used on an electric range. Either a flat or ridged bottom can be used on a gas burner. To ensure uniform processing of all jars with an electric range, the canner should be no more than 4 inches wider in diameter than the element on which it is heated.

Using boiling-water canners

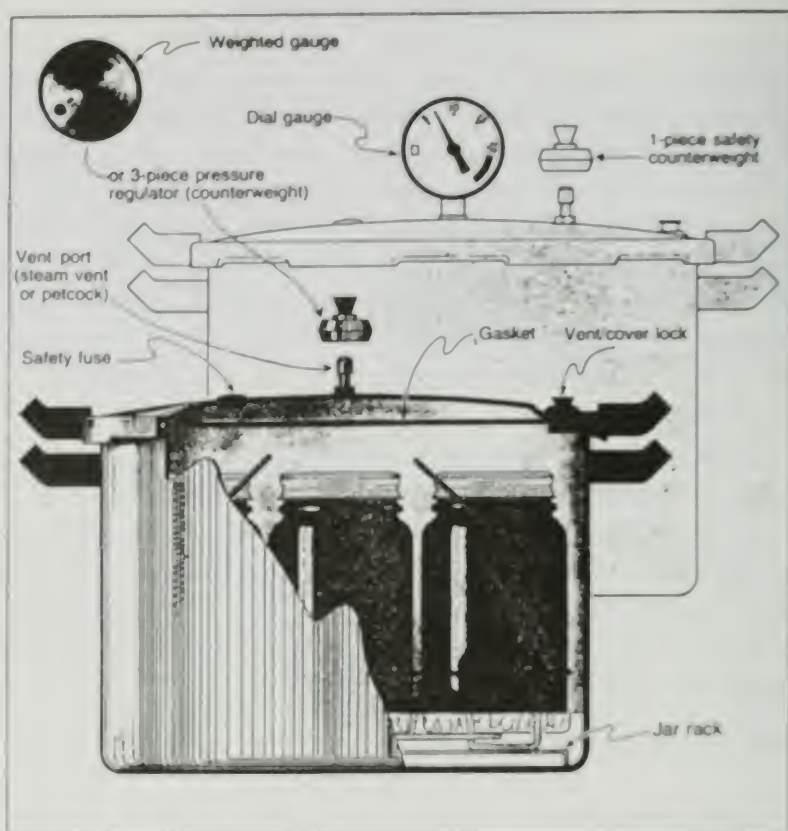
Follow these steps for successful boiling-water canning:

1. Fill the canner halfway with water.
2. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods.
3. Load filled jars, fitted with lids, into the canner rack and use the handles to lower the rack into the water; or fill the canner, one jar at a time, with a jar lifter.
4. Add more boiling water, if needed, so the water level is at least 1 inch above jar tops.
5. Turn heat to its highest position until water boils vigorously.
6. Set a timer for the minutes required for processing the food.
7. Cover with the canner lid and lower the heat setting to maintain a gentle boil throughout the process schedule.
8. Add more boiling water, if needed, to keep the water level above the jars.
9. When jars have been boiled for the recommended time, turn off the heat and remove the canner lid.
10. Using a jar lifter, remove the jars and place them on a towel, leaving at least 1-inch spaces between the jars during cooling.

Pressure canners

Pressure canners for use in the home have been extensively redesigned in recent years. Models made before the 1970's were heavy-walled kettles with clamp-on or turn-on lids. They were fitted with a dial gauge, a vent port in the form of a petcock or counterweight, and a safety fuse. Modern pressure canners are lightweight, thin walled kettles; most have turn-on lids. They have a jar rack, gasket, dial or weighted gauge, an automatic vent/cover lock, a vent port (steam vent) to be closed with a counterweight or weighted gauge, and a safety fuse.

Pressure does not destroy microorganisms, but high temperatures applied for an adequate period of time do kill microorganisms. The success of destroying all microorganisms capable of growing in canned food is based on the temperature obtained in pure steam, free of air, at sea level. At sea level, a canner operated at a gauge pressure of 10.5. lbs provides an internal temperature of 240°F -



Two serious errors in temperatures obtained in pressure canners occur because:

1. **Internal canner temperatures are lower at higher altitudes.** To correct this error, canners must be operated at the increased pressures specified in this publication for appropriate altitude ranges.

2. **Air trapped in a canner lowers the temperature obtained at 5, 10, or 15 pounds of pressure and results in underprocessing.** The highest volume of air trapped in a canner occurs in processing raw-packed foods in dial-gauge canners. These canners do not vent air during processing. To be safe, all types of pressure canners must be vented 10 minutes before they are pressurized.

To vent a canner, leave the vent port uncovered on newer models or manually open petcocks on some older models. Heating the filled canner with its lid locked into place boils water and generates steam that escapes through the petcock or vent port. When steam first escapes, set a timer for 10 minutes. After venting 10 minutes, close the petcock or place the counterweight or weighted gauge over the vent port to pressurize the canner.

Weighted-gauge models exhaust tiny amounts of air and steam each time their gauge rocks or jiggles during processing. They control pressure precisely and need neither watching during processing nor checking for accuracy. The sound of the weight rocking or jiggling indicates that the canner is maintaining the recommended pressure. The single disadvantage of weighted-gauge canners is that they cannot correct precisely for higher altitudes. At altitudes above 1,000 feet, they must be operated at canner pressures of 10 instead of 5, or 15 instead of 10, PSI.

Check dial gauges for accuracy before use each year and replace if they read high by more than 1 pound at 5, 10, or 15 pounds of pressure. Low readings cause overprocessing and may indicate that the accuracy of the gauge is unpredictable. Gauges may be checked at most county Cooperative Extension offices.

Handle canner lid gaskets carefully and clean them according to the manufacturer's directions. Nicked or dried gaskets will allow steam leaks during pressurization of canners. Keep gaskets clean between uses. Gaskets on older model canners may require a light coat of vegetable oil once per year. Gaskets on newer model canners are pre-lubricated and do not benefit from oiling. Check your canner's instructions if there is doubt that the particular gasket you use has been pre-lubricated.

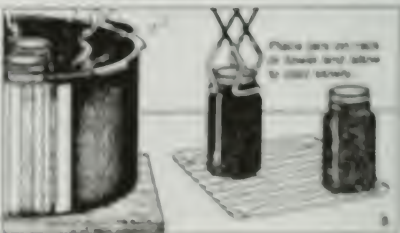
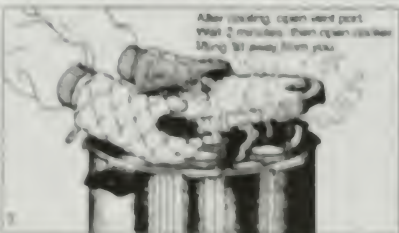
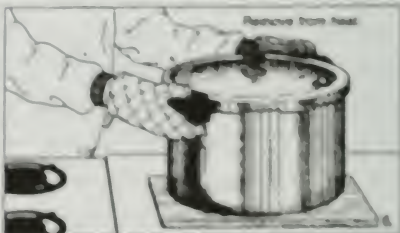
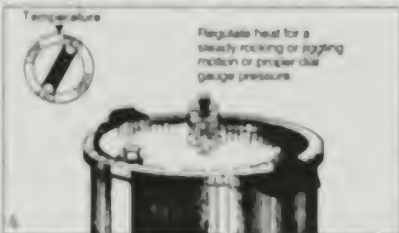
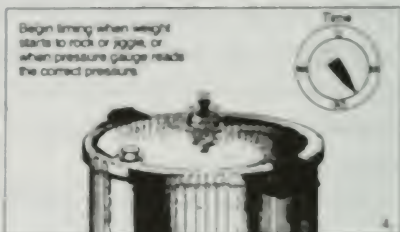
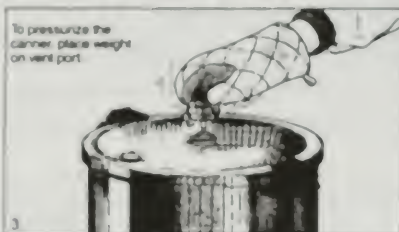
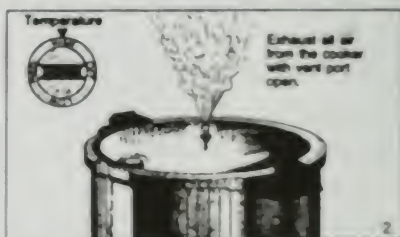
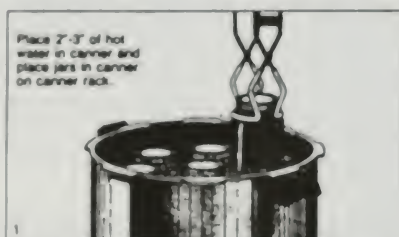
Lid safety fuses are thin metal inserts or rubber plugs designed to relieve excessive pressure from the canner. Do not pick at or scratch fuses while cleaning lids. Use only canners that have the Underwriter's Laboratory (UL) approval to ensure their safety.

Replacement gauges and other parts for canners are often available at stores offering canning equipment or from canner manufacturers. When ordering parts, give your canner model number and describe the parts needed.

Using pressure canners

Follow these steps for successful pressure canning:

1. Put 2 to 3 inches of hot water in the canner. Place filled jars on the rack, using a jar lifter. Fasten canner lid securely.
2. Leave weight off vent port or open petcock. Heat at the highest setting until steam flows from the petcock or vent port.



3. Maintain high heat setting, exhaust steam 10 minutes, and then place weight on vent port or close petcock. The canner will pressurize during the next 3 to 5 minutes.
4. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock.
5. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure variations during processing may cause unnecessary liquid loss from jars. Weighted gauges on Mirro canners should jiggle about 2 or 3 times per minute. On Presto canners, they should rock slowly throughout the process.
6. When the timed process is completed, turn off the heat, remove the canner from heat if possible, and let the canner depressurize. Do not force-cool the canner. Forced cooling may result in food spoilage. Cooling the canner with cold running water or opening the vent port before the canner is fully depressurized will cause loss of liquid from jars and seal failures. Force-cooling may also warp the canner lid of older model canners, causing steam leaks. Depressurization of older models should be timed. Standard-size heavy-walled canners require about 30 minutes when loaded with pints and 45 minutes with quarts. Newer thin-walled canners cool more rapidly and are equipped with vent locks. These canners are depressurized when their vent lock piston drops to a normal position.
7. After the canner is depressurized, remove the weight from the vent port or open the petcock. Wait 2 minutes, unfasten the lid, and remove it carefully. Lift the lid away from you so that the steam does not burn your face.
8. Remove jars with a lifter, and place on towel or cooling rack, if desired.

Selecting the correct processing time

When canning in boiling water, more processing time is needed for most raw-packed foods and for quart jars than is

needed for hot-packed foods and pint jars.

To destroy microorganisms in acid foods processed in a boiling-water canner, you must:

- Process jars for the correct number of minutes in boiling water.
- Cool the jars at room temperature.

The food may spoil if you fail to add process time for lower boiling-water temperatures at altitudes above 1,000 feet, process for fewer minutes than specified, or cool jars in cold water.

To destroy microorganisms in low-acid foods processed with a pressure canner, you must:

- Process the jars using the correct time and pressure specified for your altitude.
- Allow canner to cool at room temperature until it is completely depressurized.

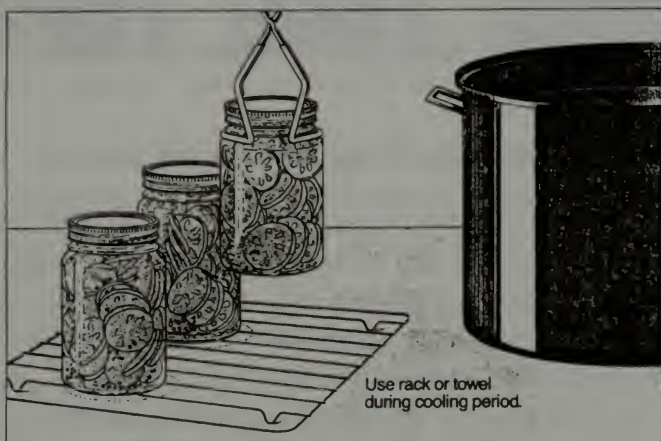
The food may spoil if you fail to select the proper process times for specific altitudes, fail to exhaust canners properly, process at lower pressure than specified, process for fewer minutes than specified, or cool the canner with water.

Using tables for determining proper process times

This set of guides includes processing times with altitude adjustments for each product. Process times for 1/2-pint and pint jars are the same, as are times for 1-1/2 pint and quart jars. For some products, you have a choice of processing at 5, 10, or 15 PSI. In these cases, choose the canner pressure you wish to use and match it with your pack style (raw or hot) and jar size to find the correct process time. The following examples show how to select the proper process for each type of canner. Process times are given in separate tables for sterilizing jars in boiling-water, dial-gauge, and weighted-gauge canners.

Cooling jars

When you remove hot jars from a canner, do not retighten their jar lids. Retightening of hot lids may cut through the gasket and cause seal failures. Cool the jars at room temperature for 12 to 24 hours. Jars may be cooled on racks or towels to minimize heat damage to counters. The food level and liquid volume of raw-packed jars will be noticeably lower after cooling. Air is exhausted during processing and food shrinks. If a jar loses excessive liquid during processing, do not open it to add more liquid. Check for sealed lids as described below.



Testing jar seals

After cooling jars for 12 to 24 hours, remove the screw bands and test seals with one of the following options:

Option 1. Press the middle of the lid with a finger or thumb. If the lid springs up when you release your finger, the lid is unsealed.

Option 2. Tap the lid with the bottom of a teaspoon. If it makes a dull sound, the lid is not sealed. If food is in contact with the underside of the lid, it will also cause a dull sound. If the jar is sealed correctly, it will make a ringing, high-pitched sound.

Option 3. Hold the jar at eye level and look across the lid. The lid should be concave (curved down slightly in the center). If center of the lid is either flat or bulging, it may not be sealed.



Reprocessing unsealed jars

If a lid fails to seal on a jar, remove the lid and check the jar-seating surface for tiny nicks. If necessary, change the jar, add a new, properly prepared lid, and reprocess within 24 hours using the same processing time. Headspace in unsealed jars may be adjusted to 1-1/2 inches and jars could be frozen instead of reprocessed. Foods in single unsealed jars could be stored in the refrigerator and consumed within several days.

Storing canned foods

If lids are tightly vacuum sealed on cooled jars, remove screw bands, wash the lid and jar to remove food residue; then rinse and dry jars. Label and date the jars and store them in a clean, cool, dark, dry place. Do not store jars above 95°F or near hot pipes, a range, a furnace, in an uninsulated attic, or in direct sunlight. Under these conditions, food will lose quality in a few weeks or months and may spoil. Dampness may corrode metal lids, break seals, and allow recontamination and spoilage.

Accidental freezing of canned foods will not cause spoilage unless jars become unsealed and recontaminated.

However, freezing and thawing may soften food. If jars must be stored where they may freeze, wrap them in newspapers, place them in heavy cartons, and cover with more newspapers and blankets.

Identifying and handling spoiled canned food

Do not taste food from a jar with an unsealed lid or food that shows signs of spoilage. You can more easily detect some types of spoilage in jars stored without screw bands. Growth of spoilage bacteria and yeast produces gas which pressurizes the food, swells lids, and breaks jar seals. As each stored jar is selected for use, examine its lid for tightness and vacuum. Lids with concave centers have good seals.

Next, while holding the jar upright at eye level, rotate the jar and examine its outside surface for streaks of dried food originating at the top of the jar. Look at the contents for rising air bubbles and unnatural color.

While opening the jar, smell for unnatural odors and look for spurting liquid and cottonlike mold growth (white, blue, black, or green) on the top food surface and underside of lid.

Spoiled low-acid foods, including tomatoes, may exhibit different kinds of spoilage evidence or very little evidence. Therefore, all suspect containers of spoiled low-acid foods, including tomatoes, should be treated as having produced botulinum toxin and handled carefully in one of two ways:

- If the swollen metal cans or suspect glass jars are still sealed, place them in a heavy garbage bag. Close and place the bag in a regular trash container or bury it in a nearby landfill.
- If the suspect cans or glass jars are unsealed, open, or leaking, they should be detoxified before disposal.

Detoxification process: Carefully place the suspect containers and lids on their sides in an 8-quart volume or larger stock pot, pan, or boiling-water canner. Wash your hands thoroughly. Carefully add water to the pot. The water should completely cover the containers with a minimum of a 1-inch level

above the containers. Avoid splashing the water. Place a lid on the pot and heat the water to boiling. Boil 30 minutes to ensure detoxifying the food and all container components. Cool and discard the containers, their lids, and food in the trash or bury in soil.

Thoroughly scrub all counters, containers, and equipment including can opener, clothing, and hands that may have contacted the food or containers. Discard any sponges or wash cloths that may have been used in the cleanup. Place them in a plastic bag and discard in the trash.

Preparing pickled and fermented foods

The many varieties of pickled and fermented foods are classified by ingredients and method of preparation.

Regular dill pickles and saurkraut are fermented and cured for about 3 weeks. Refrigerator dills are fermented for about 1 week. During curing, colors and flavors change and acidity increases. Fresh-pack or quick-process pickles are not fermented; some are brined several hours or overnight, then drained and covered with vinegar and seasonings. Fruit pickles usually are prepared by heating fruit in a seasoned syrup acidified with either lemon juice or vinegar. Relishes are made from chopped fruits and vegetables that are cooked with seasonings and vinegar.

Be sure to remove and discard a 1/16-inch slice from the blossom end of fresh cucumbers. Blossoms may contain an enzyme which causes excessive softening of pickles.

Caution: The level of acidity in a pickled product is as important to its safety as it is to taste and texture.

- Do not alter vinegar, food, or water proportions in a recipe or use a vinegar with unknown acidity.
- Use only recipes with tested proportions of ingredients.
- There must be a minimum, uniform level of acid throughout the mixed product to prevent the growth of botulinum bacteria.

CHAPTER XIX

Misc. Favorite Recipes

POLISH DUCK SOUP - "AMERICAN STYLE"

Ingredients:

6 Cups Broth (clear broth may be used from chicken or duck (some people like to use broth from pork neck bones) The easiest way is canned chicken broth.

1/2 lb. Prunes	1 Tb. vinegar
1/2 lb. Raisins	1 to 2 Tbs gravy master
2 Stalks Sliced Celery	1 egg
1 Medium Sliced Onion	2 Tb. Sour Cream
2 Carrots, Sliced about 1/2"	Flour (about 6 level tbs.)
8 Seeds of allspice (or 1/2 tsp. ground)	

1 - In large cooking pot, heat four cups of broth

2- In separate small pot, combine the following ingredients- celery, onion, carrots and allspice. Add enough water to cover ingredients. Cook until tender, add prunes or raisins, bring back to a boil. Cook about three more minutes.

3- In small deep mixing bowl, place 1 Tb. vinegar, 1 Tb., gravy master. Stir well. Add 1 egg and 2 Tb. sour cream to vinegar-gravy master mix. Stir well. Add remaining 2 cups of broth and mix well. Add 6 level tbs. flour slowly, mixing as you add the flour. Making a nice creamy texture.

4- Place cooked fruit, celery, carrots etc. to the 4 cups of heated broth. Heat to near boiling. As soup starts to boil, add flour liquid mixture slowly, stirring as you add the mixture. Boil for about five minutes. Soup is now ready for consumption. Usually taste best with home made noodles or store bought "Kluski".

Note: 2 - 3 Tb. of brown sugar may be added for a sweeter flavor.

GREEK GYRO WRAP (HERO)

2- Lbs. Lean Boneless Pork	1/2 tsp. Savory
2- Lbs. Lean Boneless Lamb	1/2 tsp. Thyme
1- Lb. Lean Boneless Beef	1 - tsp. Rosemary
2- tsp. Salt	1 Egg
2- tsp. Marjoram	1/4-Cup Soy Protein
1 - tsp. Coriander	1/2 Cup Water
1 - tsp. Black Pepper	Pita Bread

Topping-

Feta Cheese
Chopped Onion
Shredded Lettuce
Chopped Tomato

Dressing-

Oil & Vinegar or
Greek Vinagrette or
Sour Cream

Chill meat to 36-38° F. Grind meat through 3/16", plate. Mix meat first, then add all ingredients and mix well. Place mixture into loaf pan and bake in 325 deg. preheated oven for 1 1/2 hours. Remove meat from pan. After meat is cooled, place into refrigerator, cover with clean wrap. Let cool. When ready to make Gyro Wrap;

- 1- Slice cooled meat into thin slices 1/8" thick, place a desired amount of meat on a pita.
- 2- Heat in microwave for about 40 seconds on high to warm meat and pita.
- 3- Put on chopped onion, chopped tomato, shredded lettuce and shredded feta cheese.
- 4- Add either oil and vinegar or a Greek vinagrette. Wrap and eat. (some prefer sour cream instead of vinagrette)

Will make at least 15 gyros.

HUNTERS STEW (BIGOS)

Ingredients

6 Dried mushrooms or	1/2 Head large cabbage, shredded
1/2 lb. fresh mushrooms sliced.	2 Large onions, Diced
1 lb. Boneless Pork Niblets	3/4 lb. Bacon
1 1/2 lb. Fresh Polish Sausage	
2 Lbs Sauerkraut, Rinsed	
2 Cups Beef Bouillon, Use water from cooking fresh polish sausage for added flavor. rest of broth may be added to cook cabbage.	

Presoak dried mushrooms for about two hours in 1 cup of water. In large saucepan fry bacon until well done. Remove bacon, brown pork niblets on all sides in bacon drippings. Meanwhile par-boil Polish sausage for about 10 minutes after water starts to boil. Remove scum from water. Remove sausage and let cool, slice into 1" pieces. Use water from cooking sausages to make bouillon. Cook shredded cabbage separately in salt water. Bring to boil, lower heat and simmer for 20 minutes. Drain in colander. Add fresh Polish sausage slices to pork, add mushrooms with its liquid, 2 cups bouillon and rinsed sauerkraut. Cover and simmer for 1 1/2 hours. After 1 hour remove pork niblets, let cool. Then slice into small cubes. Add pork, bacon and cabbage to saucepan cook on low heat for additional 1/2 hour.

In separate fry pan add 3 tablespoon margarine or butter and fry onions until golden brown. Add to stew and mix thoroughly.

Hunters stew is always made a day or two in advance. Let season in refrigerator. Serve with a good fresh rye bread or a bread of your choice.

OPTIONS- Use smoked Polish sausage if you like, add more mushrooms if you like.

WHITE MUSHROOM SOUP "BARSZCZ"

Ingredients:

3-4 Lbs. Fresh Polish Sausage	3 Tb. Flour
1 Pint Sour Cream	1 tsp. Salt
2 Tb. White Vinegar	8 - 10 Polish Mushrooms

Place fresh Polish sausage into cooking pot and cover with water. Bring water to boil, reduce heat to a simmer. Skim residue from top of water, let sausage cook on low for about 30 minutes. During last 10 minutes of cooking, puncture all sausages to allow juice to escape. Remove sausage and put aside.

Bring broth to a boil during which time you add sour cream and flour, one spoon at a time. If you have a food blender, you can 1/2 fill it with hot broth, then add the flour to prevent lumps, along with the sour cream, salt and vinegar.

After all ingredients are blended, add sliced Polish mushrooms and let cook. During this time you can slice the cooked Polish sausage and add to the soup. About 15 minutes on medium will be fine.

Last but not least, hard boiled eggs are sliced or diced and added to the hot mushroom soup just before service.

Soup is best when eaten the next day.

The use of flour, sour cream and vinegar is used to your taste buds. More flour will make the soup thicker and of course the use of vinegar is dictated by your taste buds. Imitation sour cream can be used if you do not want to use real sour cream. Pork neck bones can be used in place of Polish sausage.

STUFFED CABBAGE BIRDS "GOLABKI"

Ingredients:

1 Large Head of Cabbage	2 Eggs
1 Lb. Ground Beef or Pork	2 Carrots Diced or Shredded
1/2 Cup Minute Rice (uncooked)	Salt & Pepper to Taste
1 Medium Onion Minced	2 Cups Chicken or Beef Bouillon

Par-boil cabbage in salt water so that leafs come apart. Separate the large leaves for filling with meat and ingredient mixture.

Mix all ingredients, including the rice thoroughly. Make individual meat balls, the appropriate size for rolling into the large cabbage leaves. Place meat into cabbage leaf, fold and roll until a nice bird is formed. Place into either a saucepan or casserole dish large enough to handle all the birds. When meat is all used up, place remainder of cabbage leaves on top of birds in saucepan. Make at least one cup of chicken bouillon and pour over birds. Can be cooked stove top in a covered saucepan on a low medium heat for about 1 to 1 1/2 hours until tender.

Option: Some people like using a can of tomato soup mixed with a can of water rather than using chicken or beef broth. This adds a nice tomato flavor to the birds — Easily serves 4

PASTA FAGIOLI

Ingredients:

8 oz.- Uncooked Ditalini-30 Macaroni	6 Cloves Chopped Garlic (More if you like)
2 -16 oz. Cans stewed tomatoes	1 Tb. Basil Leaves
2 -16 oz. Cans kidney beans or beans of your liking	1/2 tsp. Dried Thyme Leaves
2 -Cups Chicken Broth	1/2 tsp. Black Pepper
1 -Cup Chopped Onions	1 tsp. Salt
1/4 Cup Chopped Parsley	1/2 Cup Romano Cheese, Shredded
1/3 Cup Chopped Celery	1/2 Cup Sour Cream
	4 Slices Bacon Cooked & Shredded

Cook Ditalini -30 macaroni as per instructions on box. While macaroni cooks, place bacon into large saucepan and fry until done. Remove bacon, place chopped garlic into bacon drippings and brown. Add onion and celery and cook for about five minutes. Add tomatoes with its juice, beans, parsley and seasonings into saucepan. cook over medium heat until it comes to a boil. Add bacon and cooked Ditalini-30 macaroni, cover and simmer for about 5 minutes, stirring frequently. Stir in sour cream and romano cheese, cook an additional 5 minutes on medium heat.

Serve with a good Italian garlic bread and beverage of your choice. Enjoy.

OPTION: 1 - Add cooked Italian sausage sliced into small pieces.

OPTION: 2- Add 1 lb. cooked ground beef after soup is fully cooked.

MAKE AHEAD POTATOES

Ingredients:

5 Lbs. Potatoes	Pinch of Nutmeg
1/2 Cup Butter (soft)	1/4 tsp. White Pepper
12 oz. Cream Cheese (soft)	1/2 tsp. Salt
1/2 Cup Sour Cream	

Boil potatoes with salt until ready for mashing. Mash Potatoes. Soften Butter and Cream Cheese Add rest of ingredients into potatoes. Mix well using electric beater. Store in refrigerator until ready to use. Can be made night before and heat in Microwave just before serving Excellent creamy, tasty texture. Can also be made just prior to serving for dinner.

FREEZER BREAD & BUTTER PICKLES

Ingredients:

7 Cups Sliced Pickles	2 Cups Sugar
(I use small cucumbers)	1 Cup White Vinegar
1 Cup Sliced Onion	1 Tb. Celery Seed
2 Tb. Purified Salt	1Tb. Mustard Seeds

Place pickles, onion and salt in a deep bowl. Heat sugar, white vinegar, celery seed and mustard seed, until all sugar is dissolved. Pour over the pickle mixture. Let stand for 24 hours in the refrigerator.

Place in freezer containers and freeze. These are delicious and crispy. Take out one container at a time as needed.

MAKING SAUERKRAUT AT HOME

Prepare 17 lbs. of cabbage by removing outer leaves. The cabbage is then cut into 4 pcs. or quartered. Remove core, rinse to remove hidden dirt. Drain cabbage, then shred.

Weigh out 5 lbs. shredded cabbage, sprinkle with 3 tablespoons of canning salt or Sausage Maker purified salt. Turn salted cabbage and mix thoroughly until the salt is evenly distributed with the cabbage (Sausage Maker meat mixing tubs are really great for this). Cabbage is then transferred to a crock. If a crock is not available, you can use a 5 gallon brining bucket. This will easily hold 34 lbs. of cabbage, because that's what I use when making sauerkraut. Crockes are pretty hard to come by these days and a plastic bucket or stainless steel container will also serve the purpose.

After placing the salted cabbage into the container it then has to be pressed down. You can use a potato masher, a meat mallet or even your fists to punch it down or anything else that will do the job. Repeat the entire process every time you shred 5 lbs. of cabbage until you are done. By the time you get to the last batch, you will have liquid coming to the top.

At this point the shredded cabbage has to be covered and weighted down. You can cut a clean piece of wood or plastic to cover almost the whole top and weight it down with a clean rock or some other weight put into a heavy duty plastic bag. The shredded cabbage has to be held beneath the surface of the board weighing down the cabbage. A little cabbage juice or liquid must always be left on top to cover the board. Cover the top of container with a cloth to keep out dust or insects. The cabbage is then allowed to ferment from 4 to 5 weeks at room temperature 70° F.

During this time the sauerkraut will start to emit gas and a foam will form on top as well as extra liquid. This has to be watched daily as the extra liquid and foam have to be removed or a mold can form and ruin the sauerkraut. If you take off too much water or it should evaporate too quickly by itself, you may add extra tap water to keep the board and sauerkraut covered. After a given period of time you can taste a little sauer-

kraut to see how far its come along. This is the way plain sauerkraut is made.

Another variation of sauerkraut is to slice some carrots about 1/8" to 1/4" in thickness along with a handful of whole caraway seed placed on top of every layer of 5 lbs. of shredded cabbage after it is punched down.

When sauerkraut reaches the desired sourness you want, it should then be quickly refrigerated to prevent further fermentation. It can be packed in smaller containers or even frozen.

GLOSSARY

Acid foods - Foods which contain enough acid to result in a pH of 4.6 or lower. Includes all fruits except figs; most tomatoes; fermented and pickled vegetables; relishes; and jams, jellies, and marmalades. Acid foods may be processed in boiling water.

Altitude - The vertical elevation of a location above sea level.

Ascorbate - A chemical or salt that is derived from the vitamin C family.

Ascorbic acid - The chemical name for vitamin C. Lemon juice contains large quantities of ascorbic acid and is commonly used to prevent browning of peeled, light-colored fruits and vegetables.

Bacteria - A large group of one-celled microorganisms widely distributed in nature. See microorganism.

Blancher - A 6- to 8-quart lidded pot designed with a fitted perforated basket to hold food in boiling water, or with a fitted rack to steam foods. Useful for loosening skins on fruits to be peeled, or for heating foods to be hot packed.

Boiling-water canner - A large standard-sized lidded kettle with jar rack, designed for heat-processing 7 quarts or 8 to 9 pints in boiling water.

Botulism - An illness caused by eating toxin produced by growth of *Clostridium botulinum* bacteria in moist, low-acid food, containing less than 2 percent oxygen, and stored between 40° and 120°F. Proper heat processing destroys this bacterium in canned food. Freezer temperatures inhibit its growth in frozen food. Low moisture controls its growth in dried food. High oxygen controls its growth in fresh foods.

Brine Injection - The injecting of cure into the meat. A rapid form of curing meats.

Brine Soaking - A process for curing meat by submerging in water that usually contains a combination of salt, cure and spices.

Canning - A method of preserving food in air-tight vacuum-sealed containers and heat processing sufficiently to enable storing the food at normal home temperatures.

Canning salt - Also called pickling salt. It is regular table salt without the anticaking or iodine additives.

Certified Pork - Pork products that have the trichinae already destroyed by the process of freezing.

Citric acid - A form of acid that can be added to canned foods. It increases the acidity of low-acid foods and may improve the flavor and color.

Cure - This word is commonly used in place of the term

sodium nitrite - sodium nitrate. Cure could also mean potassium nitrite, potassium nitrate, sodium nitrite and sodium nitrate.

Dextrose - A sugar less sweet than cane sugar, a form of glucose.

Erythorbates - A chemical or salt closely related to ascorbates.

Fermentation - A process used in semi-dry and dry-cured sausages to obtain a tangy flavor.

Fermento - A dairy-based, controlled fermentation product in powdered form. It is used much the same as lactic acid starters, but needs no special handling, such as refrigeration or freezing.

Green Weight - A cut of meat in its fresh state, before curing or processing.

Humidity - Used in the process of dry curing or semi-dry curing sausages. Humidity prevents the surface of the meat from drying out too quickly, allowing the moisture to escape from the center.

Hygrometer - An instrument for measuring humidity when making semi-dry or dry-cured sausages.

Instacure - A trade name for the word "cure." Can be either sodium nitrite or sodium nitrate in combination with sodium nitrate. Both are on a salt carrier.

Lactic Acid Starter Cultures - A form of bacteria added directly to meat to speed the fermenting of the sausages. This is a highly perishable product that must be used quickly after it is thawed.

Liquid Smoke - A liquid that is obtained by condensing the smoke of green hickory wood.

Meat Pump - A large hypodermic needle used to distribute pickle cure more evenly.

Monosodium Glutamate - Commonly known as MSG. Usually made from beets or molasses, it is only used to enhance the flavor of food.

Nitric Oxide - A by-product of sodium nitrite. It is nitric oxide that really cures the meat.

Nitrosamines - A cancer-producing substance. Sodium nitrite - sodium nitrate has been implicated as producing this substance under certain conditions when used in curing certain meats, especially bacon.

Non-Fat Dry Milk - A skim milk used in making lunchmeats and sausage products. Dried skim milk is made by drying sweet skim milk from cows' milk from which the fat has been separated. The skim milk has the ability to help retain moisture in sausages and lunchmeats. This skim milk has no effect on the flavor of the meat until its usage exceeds 12 percent. Federal laws allow 3 1/2 percent usage per 100 pounds of meat.

Overhauling - Changing the position of meat being cured. Usually placing the meat on top to the bottom of the curing box and the bottom meats to the top. This is done at specified intervals.

Phosphate - An ingredient used commercially to increase the water-holding capability of the muscle protein found in meat. Phosphates decrease the amount of cooked juices that will escape from hams, picnics, loins, etc.

Potassium Chloride - A salt with most of the same properties of common table salt (sodium chloride). Usually, it is used in place of sodium chloride.

Regular Trimmings - Pork trimmings that are 50 percent fat and 50 percent meat.

Salometer - An instrument or hydrometer used to test the degree of saturation of salt brines. The temperature of the water should be 38 degrees F. when taking a reading. Pure water will read 0 degrees and a salt saturated brine will read 100 degrees on the salometer. Many times the term salinometer is used in place of salometer.

Salt - Common ordinary table salt. The chemical name is sodium chloride.

Smearing - A term used to describe a sausage that has an outside appearance of looking very fat but is actually very lean. This condition is caused by letting the temperature of the meat rise by improper refrigeration. It can also be caused by a dull grinding plate and cutting blade which mash the meat rather than cut it. Smearing can also be caused by using equipment that has not been properly cooled before it's used, such as warm grinder heads or a warm stuffer cylinder.

Smokehouse Shrink - The loss of moisture in the product. Usually caused by cooking at too high a temperature in the smoker.

Sodium Acetate - A food-grade chemical used in creating an artificial humidity for semi-dry or dry-cured sausages.

Sodium Nitrate - A colorless crystal that is used to make meat cures, explosives and fertilizers. Nitrate is poisonous.

Sodium Nitrite - A salt or ester of nitric acid. Also a poison.

Soy Protein Concentrate - When mixed directly with meat this product helps to make the meat juicy. It helps to prevent shrinkage and increases the weight of the end product. Generally speaking, it does the same job that non-fat dry milk performs. Its use is also regulated. Federal laws limit its use to 31/2 percent per 100 pounds of meat.

Special Trimmings - The commercial term used to purchase pork trimmings that are generally 80 percent meat and 20 percent fat.

Starter Cultures - A product developed in recent years for speeding the process of drying and fermenting dry and semi-dry sausages.

Stitch Pump - A piece of meat is generally pumped along its length using this method. Many times a gang of needles is used to employ this method.

Sugar - The flavoring of meats is generally done with white or brown sugars. Sugar is made from cane or beets. Maple sugar is also used to impart a special flavor and aroma. Dextrose and similar products are less sweet.

Trichinae - Parasites sometimes found in pork and some wild game meat, like bear meat. These parasites in meat are usually destroyed by cooking at the proper temperature or using proper cures when dry-curing meat in combination with salt.

Trichinosis - Infestation of the infective parasite worm trichina sometimes found in the muscle tissue of a swine carcass. This parasite causes no particular inconvenience as far as can be judged from the external appearance of these animals. There is no practical system to inspect the carcass of a swine for trichinae and the destruction of this parasite is left up to cooks, meat processors and anyone else preparing this meat. Fresh pork should be cooked to at least 138 degrees F. to destroy the trichinae parasite. Infestation in a human being may cause severe, excruciating pain, prolonged illness, and even death.

Vinegar - Acetic acid is commonly known as vinegar. Since early times it has been used for preserving and flavoring. Vinegar in conjunction with a salt mixture has a very pronounced effect on microorganisms. Vinegar is gauged by grain. A pickle can be made using a 100 grain vinegar, 31/2 percent salt and 31/2 percent vinegar (41/4 parts vinegar to 51/2 parts water).

TROUBLE SHOOTING & TIPS

PROBLEM	REASONS AND SOLUTIONS
1 - Meat Grinds Mushy	1- Chill meat before grinding to 32 - 34°. 2 - Make sure cutting knife is on properly 3 - Locking ring not tight on grinder
2 - Irregular flavor in finished product	1 - Spices not mixed thoroughly into meat 2 - Improper measurement of spices
3 - Smoked product not brown enough	1 - Lack of smoking time 2 - Sawdust too damp, may not burn 3 - Blooming period not long enough, at least 2 hours at room temperature.
4 - Product too salty	1 - Cut back 1/3 salt in a cured or fresh product 2 - Dry cured requires proper amount of salt. Do not cut back when dry curing product.
5 - Tough Casing	1 - Heat to high when initially starting to smoke, 2- casing may be naturally tough
6 - Low humidity for dry curing in refrigerator	1 - Use cookie sheet with raised edges. Place 1 lb. table salt on sheet and spread out. Use enough water to barely cover salt. Place in bottom of refrigerator. Will give about 70% humidity. Add water as needed. A hygrometer is a must for dry curing.
7 - Sausage Maker 3 lb. Stuffer, Meat escapes	1 - Use household aluminum foil, Large enough to fold about 4 times. Place on top of meat in stuffer, press down platen, edges will seal with aluminum foil.
8 - Cold Smoking	1 - Cold smoking is generally used for cooking cheese sausage, meats and bacon at a temperature of 90° F.
9 - Green Patches	1 - Nitrite burn due to excessive use of nitrite.

	<ul style="list-style-type: none"> 2 - Nitrite burn due to improper distribution 3 - Undercured due to too short curing time 4 - Undercured due to too cold curing room temperature
10 - Green Bacon	1 - Bacterial growth due to salt concentration too low or moisture content too high
11 - Dark Frying Bacon	<ul style="list-style-type: none"> 1 - Poor sugar quality, use of too much powdered dextrose 2 - Excessive heat during frying
12 - Pale Color of Hams	<ul style="list-style-type: none"> 1 - Ham not thoroughly cured 2 - Curing rate and efficiency retarded due to abnormally low curing temperature
13 - Rancidity	<ul style="list-style-type: none"> 1 - Salt may contain heavy metal impurities which are pro-oxidants 2 - Air leak in package 3 - Storage life extended too long, too long exposure to light during storage 4 - Bacterial enzymes
14 - Musty, weed, parsnips cheesy	1 - Bacterial growth due to insufficient salt, poor sanitation, or abusive storage temperature.
15 - Lack of cured flavor	1 - Incomplete cure or poor distribution of cure.
16 - Fat rendering at tip of smoke stick	<ul style="list-style-type: none"> 1 - Too much heat during cooking 2 - Too rapid heating 3 - Heated too high
17 - Color faded or smeared at time of stuffing	<ul style="list-style-type: none"> 1 - Meat too warm during grinding 2 - Meat too warm during stuffing
18 - Central discoloration	<ul style="list-style-type: none"> 1 - Insufficient thermal process. Cooking to a minimum internal temperature of 137° F and optimum 155° F will reduce discoloration.
19 - Case hardening of fermented sausage	1 - Sausage dried too quickly, lack of humidity

CONVERTING WEIGHTS, MEASURES & TEMPERATURES

English and American weights, given in ounces and pounds, are identical. On the other hand British liquid measures (cups, pints, quarts ect.)* are larger by 1/5 their U.S. counterparts.

*A British teaspoon is equivalent to about 1-1/4 U.S. teaspoons and the British tablespoon = 1 1/2 American tablespoons. The British measuring cup is 10 fluid oz., but since a British fluid oz. is .96 of a U.S. fluid oz., it contains 9.6 U.S. fluid oz. (160 British fl. oz.). In other words, the Imperial units are 20% larger than their American counterparts. A British Imperial quart = 1.2 U.S. quarts. Despite the inroads made by the metric system, the Imperial measures are still in use in the British Isles and countries with historic links to the British Commonwealth.

CUSTOMARY U.S. MEASURES AND EQUIVALENTS	METRIC MEASURES AND EQUIVALENTS
LENGTH 1 inch (in) = 2.54 cm 1 foot (ft) = 12 in = .3084 m 1 yard (yd) = 3 ft = .9144 m 1 mile (mi) = 1760 yd = 1.6093 km 1 nautical mile = 1.152 mi = 1.853 km	1 millimeter (mm) = .0394 in 1 centimeter (cm) = 10 mm = .3937 in 1 meter (m) = 1000 mm = 1.0936 yd 1 kilometer (km) = 1000 m = .6214 mi
AREA 1 square inch (in ²) = 6.4516 cm ² 1 square foot (ft ²) = 144 in ² = .093 m ² 1 square yard (yd ²) = 9 ft ² = .8361 m ² 1 acre = 4840 yd ² = 4046.86 m ² 1 square mile (mi ²) = 640 acre = 2.59 km ²	1 sq centimeter (cm ²) = 100 mm ² = .155 in ² 1 sq meter (m ²) = 10,000 cm ² = 1.196 yd ² 1 hectare (ha) = 10,000 m ² = 2.4711 acres 1 sq kilometer (km ²) = 100 ha = .3861 mi ²
WEIGHT 1 ounce (oz) = 437.5 grains = 28.35 g 1 pound (lb) = 16 oz = .4536 kg 1 short ton = 2000 lb = .9072 t 1 long ton = 2240 lb = 1.016 t	1 milligram (mg) = .0154 grain 1 gram (g) = 1000 mg = .0353 oz 1 kilogram (kg) = 1000 g = 2.2046 lb 1 tonne (t) = 1000 kg = 1.1023 short tons 1 tonne = .9842 long ton
VOLUME 1 cubic inch (in ³) = 16.387 cm ³ 1 cubic foot (ft ³) = 1728 in ³ = .028 m ³ 1 cubic yard (yd ³) = 27 ft ³ = .7476 m ³ 1 fluid ounce (fl oz) = 2.957 cl 1 liquid pint (pt) = 16 fl oz = .4732 l 1 liquid quart (qt) = 2 pt = .946 l 1 gallon (gal) = 4 qt = 3.7853 l 1 dry pint = .5506 l 1 bushel (bu) = 64 dry pt = 35.2381 l	1 cubic centimeter (cm ³) = .061 in ³ 1 cubic decimeter (dm ³) = 1000 cm ³ = .353 ft ³ 1 cubic yard (m ³) = 1000 dm ³ = 1.3079 yd ³ 1 liter (l) = 1 dm ³ = .2642 gal 1 hectoliter (hl) = 100 l = 2.8378 bu

TEMPERATURE: CELSIUS° = 5/9 (F° - 32°) FAHRENHEIT° = 9/5 C° + 32°

To convert Fahrenheit to Centigrade, subtract 32 degrees from given number, multiply that number by 5/9 or .55.
To convert Celsius to Fahrenheit, multiply the given number by 9/5 or 1.8 and add 32 degrees.

COMMON ABBREVIATIONS

milligram	- mg.	milliliter	- ml.	teaspoon	- tsp
gram	- gr.	liter	- l.	tablespoon	- Tb
decagram	- dag.	millimeter	- mm.	pound	- lb.
kilogram	- (in colloquial speech often called "kilo")	centimeter	- cm.	fluid ounces	- fl oz.
		meter	- m.		

US. MEASURE	METRIC	
	EXACT CONVERSION	STANDARD MEASURE
OUNCES-WEIGHT		
1 oz.	28.3 grams	30 grams
2 oz.	56.7 grams	55 grams
3 oz.	85 grams	85 grams
4 oz.	113.4 grams	115 grams
5 oz.	141.7 grams	140 grams
6 oz.	170.1 grams	170 grams
7 oz.	198.4 grams	200 grams
8 oz.	226.8 grams	250 grams
12 oz.	340 grams	350 grams
16 oz.	453.6 grams	500 grams
32 oz.	917.2 grams	1000 grams
FLUID OUNCE		
1 fl oz (1/8 cup or 1/32 quatr)	29 milliliters	-
4 fl oz (1/2 cup or 1/8 quart)	118 milliliters	-
8 fl oz (1 cup, 1/2 pint or 1/4 quart)	236 milliliters	-
16 fl oz (2 cups, 1 pt or 1/2 quart)	473 milliliters	-
32 fl oz (4 cups, 2 pints, or 1 quart)	946 milliliters	0.95 liter
128 fl oz (4 quarts or 1 gallon)	3,785 milliliters	3.8 liter

US. MEASURE	METRIC	
	EXACT CONVERSION	STANDARD MEASURE
SPOONS		
1/4 teaspoon	1.2 milliliters	1 milliliter
1/2 teaspoon	2.4 milliliters	2 milliliters
1 teaspoon	4.7 milliliters	5 milliliters
2 teaspoons	9.4 milliliters	10 milliliters
1 tablespoon	14.2 milliliters	15 milliliters
CUPS		
1/4 cup (4 Tb)	56.8 milliliters	50 milliliters
1/3 cup (5 1/3 Tb)	75.6 milliliters	75 milliliters
1/2 cup (8 Tb)	113.7 milliliters	125 milliliters
2/3 cup (10 2/3 Tb)	151.2 milliliters	150 milliliters
3/4 cup (12 Tb)	170.5 milliliters	175 milliliters
1 cup (16 Tb)	227.3 milliliters	250 milliliters
4 1/3 cups	984.8 milliliters	1000 milliliters, 1 liter

Measure

Teaspoons

Under 1/8 teaspoon	Dash or pinch
1-1/2 teaspoons	1/2 tablespoon
3 teaspoons	1 tablespoon

Tablespoons

1 tablespoon	3 teaspoons
4 tablespoons	1/4 cup
5-1/3 tablespoons	1/3 cup
8 tablespoons	1/2 cup
10-2/3 tablespoons	2/3 cup
16 tablespoons	1 cup

Cups

1/4 cup	4 tablespoons
1/3 cup	5-1/3 tablespoons
1/2 cup	8 tablespoons
1/2 cup	1/4 pint
2/3 cup	10-2/3 tablespoons
1 cup	16 tablespoons
1 cup	1/2 pint
2 cups	1 pint
4 cups	1 quart

Liquid Measures

2 tablespoons	1 fluid ounce
3 tablespoons	1 jigger
1/4 cup	2 fluid ounces
1/2 cup	4 fluid ounces
1 cup	8 fluid ounces

Spice Conversions

Oz. to Tbs. - Based on a Level Tablespoon

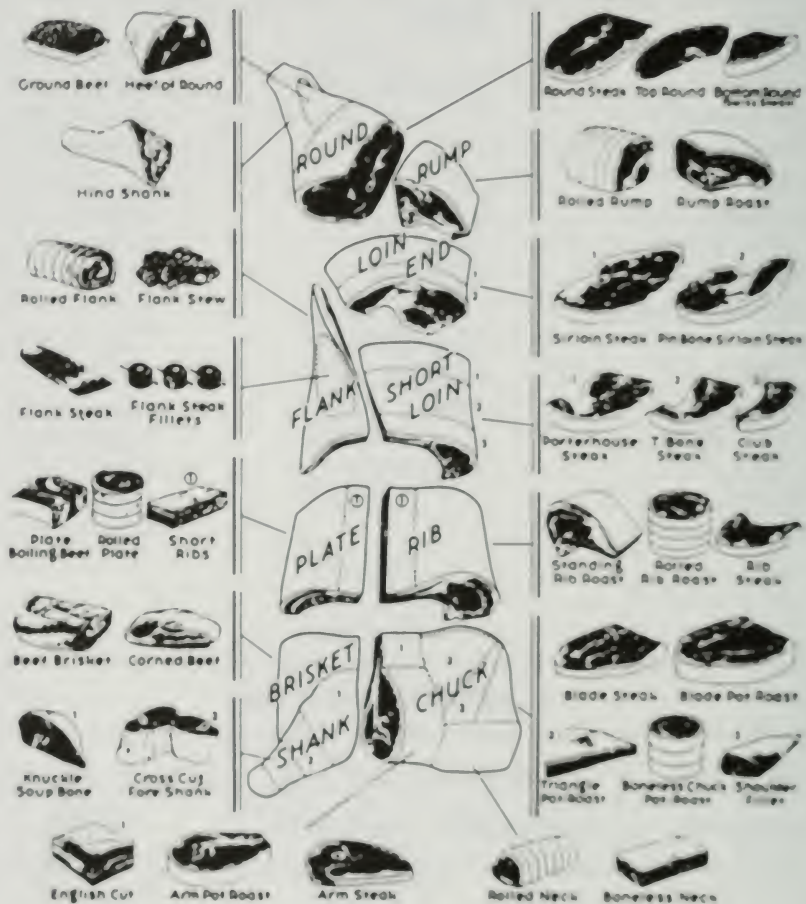
Allspice	Whole	1 Oz. = 4 Tbs.
Anise	Ground	1 Oz. = 4 Tbs.
Bay Leaf	Ground	1 Oz. = 5 Tbs.
Basil Powder		1 Oz. = Tbs.
Basil Leaf		1 Oz. = 8 Tbs.
Chili Powder		1 Oz. = 4 Tbs.
Caraway Seed		1 Oz. = 3 Tbs.
Caraway Powder		1 Oz. = 5 Tbs.
Celery	Ground	1 Oz. = 3 Tbs.
Cloves	Ground	1 Oz. = 4 Tbs.
Coriander	Ground	1 Oz. = 5 Tbs.
Corn Syrup	Solid	1 Oz. = 2 Tbs.
Fennel Seed	Whole	1 Oz. = 3 Tbs.
Fennel Seed	Ground	1 Oz. = 3 Tbs.
Fennel Seed	Cracked	1 Oz. = 3 Tbs.
Fermento		1 Oz. = 4 Tbs.
Garlic	Powder	1 Oz. = 3 Tbs.
Garlic	Granulated	1 Oz. = 3 Tbs.
Garlic	Cracked	1 Oz. = 3 Tbs.
Garlic		1 Clove = 1/8 tsp.
Ginger	Ground	1 Oz. = 4 Tbs.
Gelatin		1 Oz. = 3 Tbs.
Honey		1 Oz. = 1 tsp.
Mace		1 Oz. = 4 Tbs.
Marjoram	Whole	1 Oz. = 8 Tbs.
Marjoram	Powdered	1 Oz. = 8 Tbs.
Mustard Seed	Ground	1 Oz. = 4 Tbs.
Mustard Seed	Whole	1 Oz. = 3 Tbs.
Non Fat Dry Milk		1 Oz. = 3 Tbs.
Nutmeg	Ground	1 Oz. = 3 Tbs.
Onion	Powder	1 Oz. = 3 Tbs.
Onion	Cracked	1 Oz. = 3 Tbs.
Paprika	Ground	1 Oz. = 4 Tbs.
Pepper	Course	1 Oz. = 4 Tbs.
Pepper	Black	1 Oz. = 4 Tbs.
Pepper	White	1 Oz. = 4 Tbs.
Pepper	Whole	1 Oz. = 3 Tbs.
Pepper	Red Leaf	1 Oz. = 5 Tbs.
Pepper	Cayenne	1 Oz. = 4 Tbs.

Powdered Dextrose		1 Oz. = 3 Tbs.
R. P. Lean		1 Oz. = 3 Tbs.
Sage		1 Oz. = 8 Tbs.
Salt	Purified	1 Oz. = 1-1/2 Tbs.
Sugar	Brown	1 Oz. = 1-1/2 Tbs.
Soy Protein		1 Oz. = 3 Tbs.
Thyme	Ground	1 Oz. = 4 Tbs.
Instacure #1		1 Oz. = 2 Tbs.
Instacure #2		1 Oz. = 2 Tbs.
Sugar		1 Oz. = 1-1/2 Tbs.
Oregano	Leaf	1 Oz. = 9 Tbs.
Celery Seed	Ground	1 Oz. = 4 Tbs.
Cardamon	Ground	1 Oz. = 5 Tbs.
Coriander Seed		1 Oz. = 5 Tbs.
Curry	Ground	1 Oz. = 4 Tbs.
Cumin	Ground	1 Oz. = 4 Tbs.
Fennel Seed	Whole	1 Oz. = 4 Tbs.
Onion Salt		1 Oz. = 2 Tbs.
Mustard	Ground	1 Oz. = 4 Tbs.
Pickling Spice		1 Oz. = 3 Tbs.
Cinnamon		1 Oz. = 3 Tbs.

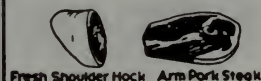
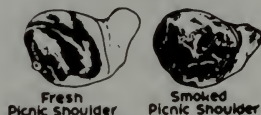
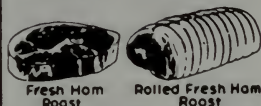
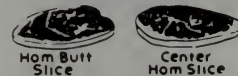
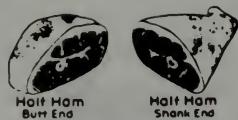
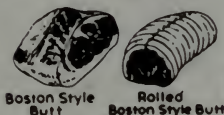
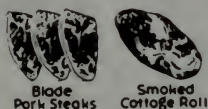
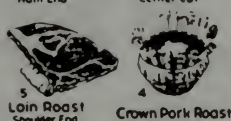
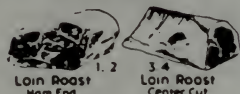
GRINDER PLATES

PLATE SIZE #	PLATE DIAMETER ENGLISH METRIC		CENER WHOLE SIZE
8	2 5/16"	62 mm	3/8"
10	2 3/4"	70 mm	3/8"
22	3 1/4"	82 mm	7/16"
32	3 5/16"	100 mm	1/2"

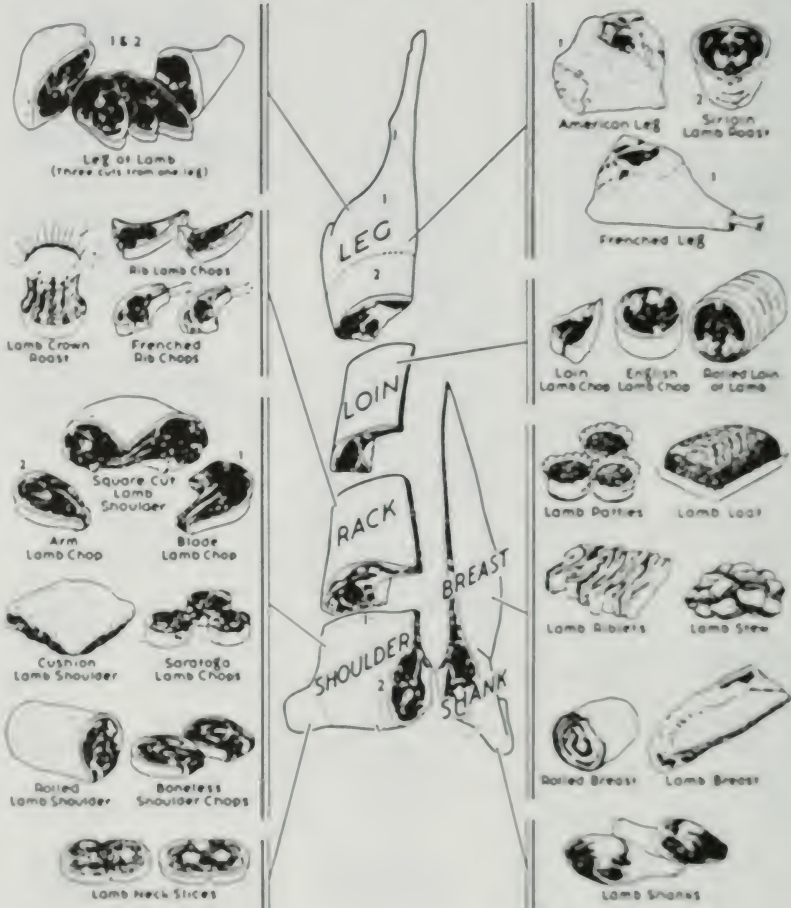
BEEF CHART



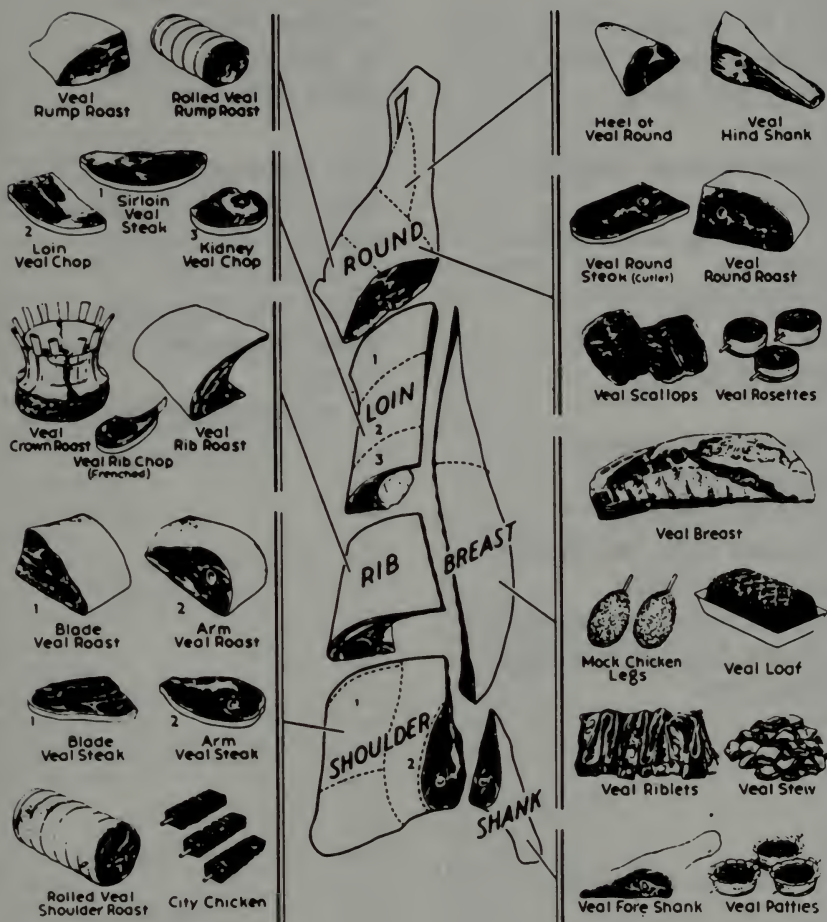
PORK CHART



LAMB CHART



VEAL CHART



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How I got into sausage making

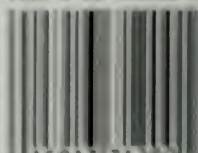
Rytek Kutas

The meat was mixed well and seasoned. It was Christmas time to me as the aromas of garlic, marjoram and black pepper permeated the entire house. The meat was then allowed to season overnight, and early the next morning it was stuffed into a large-size hog casing. The sausage was then placed in a 55-gallon drum and smoked over a low fire until 1 or 2 p.m. in the afternoon of Christmas Eve. You really knew it was Christmas.

Somewhere in the middle of our house there was the aroma of smoked kielbasa and a freshly-cut Christmas tree. These combined smells were unmistakably Christmas.

This was the beginning of my sausage-making days as a little boy during the depression of the early 1930's. As time went on and my parents got older, I was allowed to mix the meat and stuff it in the casings. Each successive year my parents taught me another step in the art of making sausage, until they could sit back and allow me to make it from beginning to end under their supervision. I learned it all—washing casings, cutting meat, stuffing meat and smoking as well.

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